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DRINKING WATER SURVEILLANCE PROGRAM

**MITCHELL'S BAY
WATER TREATMENT
PLANT**

REPORT FOR 1991 AND 1992

ISSN 0840-513X

**MITCHELL'S BAY WATER TREATMENT PLANT
DRINKING WATER SURVEILLANCE PROGRAM
REPORT FOR 1991 AND 1992**

APRIL 1994



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PIBS 2966

EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

MITCHELL'S BAY WATER TREATMENT PLANT 1991 AND 1992 REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to include all municipal supplies in Ontario. In 1991, 96 supplies and in 1992, 109 supplies were being monitored.

The Mitchell's Bay water treatment plant is a package plant which uses conventional treatment and treats water from Lake St. Clair. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection. Powder activated carbon is added for taste and odour control. This plant has a design capacity of 1.09 x 1000 m³/day. The Mitchell's Bay water treatment plant serves a population of approximately 400.

Water at the plant was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals), organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons and volatiles) and radiological (radionuclides). Most laboratory analyses were conducted at the Ministry of the Environment and Energy facilities in Rexdale, Ontario. Radionuclides were analyzed by the Ministry of Labour.

Table A is a summary of all results by group.

The health related guideline for lead was exceeded in one treated water sample. The District Officer was notified and a resample was initiated. This lead result was not confirmed by the resample.

No other known health related guidelines were exceeded.

The Mitchell's Bay water treatment plant, for the sample years 1991 and 1992, produced acceptable quality water. No samples were taken in the distribution system for this sampling period.

TABLE A
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

SUMMARY TABLE BY SCAN

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE
A ' ' INDICATES THAT NO SAMPLE WAS TAKEN

SCAN	SITE	RAW TESTS	POSITIVE	%POSITIVE	TREATED TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL		36	18	50	11	0	0
CHEMISTRY (FIELD)		35	35	100	70	66	94
CHEMISTRY (LABORATORY)		282	259	91	282	209	74
METALS		288	116	40	288	113	39
CHLOROCARBOXIC ACIDS		154	0	0	154	0	0
CHLOROPHENOLS		17	0	0	23	0	0
PESTICIDES AND PCB		378	0	0	371	1	0
PHENOLICS		12	2	16	11	0	0
POLYAROMATIC HYDROCARBONS		50	0	0	50	0	0
SPECIFIC PESTICIDES		67	0	0	73	0	0
VOLATILES		360	1	0	360	48	13
RADIONUCLIDES		21	5	23	21	4	19
TOTAL		1,700	436		1,714	441	

DRINKING WATER SURVEILLANCE PROGRAM

MITCHELL'S BAY WATER TREATMENT PLANT 1991 AND 1992 REPORT

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to include all municipal supplies in Ontario. In 1991, 96 supplies and in 1992, 109 supplies were being monitored.

Appendix A has a full description of the DWSP.

The DWSP was initiated for the Mitchell's Bay water treatment plant in the spring of 1985 as part of a study on the St. Clair/Detroit River area. Previous DWSP annual reports have been published for 1986, 1987, 1988, 1989 and 1990.

PLANT DESCRIPTION

The Mitchell's Bay water treatment plant is a package plant which uses conventional treatment and treats water from Lake St. Clair. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection. Powder activated carbon is added for taste and odour control. This plant has a design capacity of $1.09 \times 1000 \text{ m}^3/\text{day}$. The Mitchell's Bay water treatment plant serves a population of approximately 400.

The sample day flows ranged from $0.05 \times 1000 \text{ m}^3/\text{day}$ to $0.20 \times 1000 \text{ m}^3/\text{day}$.

General plant information is presented in Table 1 and a schematic of plant processes, chemical addition points and sampling locations in Figure 1.

SAMPLING AND ANALYSES

Stringent DWSP sampling protocols were followed to ensure that all samples were collected in a uniform manner (see Appendix B).

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. Retention time was calculated by dividing the volume of water between two sampling points by sample day flow. For example, if it was determined that retention time within the plant was five hours, then there would be a five hour interval between the raw and treated sampling. Similarly, if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site would be sampled one day after the treated water from the plant.

To obtain a representative raw water sample, free from any added chemicals, at plants which used chlorine for zebra mussel control, the operator was required to turn off the chlorine feed to the mouth of the intake and allow enough time for the chlorinated water to clear from the intake works.

Plant operating personnel routinely analyzed parameters for process control (Table 2).

At all distribution system locations, two types of samples were obtained, a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples were used to make an assessment of the change in the levels of inorganic compounds and metals due to leaching from, or deposition on, the plumbing system. The only analyses carried out on the standing samples, therefore, were laboratory chemistry and metals. The free flow sample represented fresh water from the distribution system main, since the sample tap was flushed for five minutes prior to sampling.

Water at the plant was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals), organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons and volatiles) and radiological (radionuclides). Most laboratory analyses were conducted at the Ministry of the Environment and Energy facilities in Rexdale, Ontario. Radionuclides were analyzed by the Ministry of Labour.

RESULTS

Field measurements were recorded on the day of sampling and were entered onto the DWSP database as submitted by plant personnel.

Table 3 contains information on delay time between the raw and treated water sampling, flow rate, and treatment chemical dosages.

Table 4 is a summary of all results by parameter and by water type. If a parameter was not detected, the total number of negative sample results is given. In contrast, if a parameter was detected at any location, the detailed results for all samples are provided.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment and Energy laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 lists all parameters analyzed in the DWSP.

Associated guidelines and detection limits are also supplied on Tables 4 and 5. Parameters are listed alphabetically within each scan.

DISCUSSION

GENERAL

Water quality was judged by comparison with the Ontario Drinking Water Objectives publication (ODWOs). When an Ontario Drinking Water Objective (ODWO) was not available, guidelines/limits from other agencies were used. These guidelines were obtained from the Parameter Listing System database.

IN THIS REPORT, DISCUSSION IS LIMITED TO:

- THE TREATED AND DISTRIBUTED WATER;
- ONLY THOSE PARAMETERS WITH CONCENTRATIONS ABOVE GUIDELINE VALUES; AND
- POSITIVE ORGANIC PARAMETERS DETECTED.

BACTERIOLOGICAL

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological quality. Routine monitoring programs usually require that multiple samples be collected in a given system. Full interpretation of bacteriological quality cannot be made on the basis of single samples. Standard plate count was the only bacteriological analysis conducted on the treated and distributed water. No results were above the guideline.

INORGANIC & PHYSICAL

CHEMISTRY (FIELD)

Field pH was below the ODWO Recommended Operational Guideline of 6.5-8.5 pH units in 2 of 11 treated water samples with a minimum reported value of 6.39 pH units.

It is desirable that the temperature of drinking water be less than 15°C. The palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The temperature of delivered water may increase in the distribution system due to the warming effect of soil in late summer and fall and/or as a result of higher temperatures in the source water.

Field temperature exceeded the ODWO Aesthetic Objective of 15°C in 6 of 11 treated water samples with a maximum reported value of 24.6°C.

CHEMISTRY (LABORATORY)

Alkalinity was below the ODWO Recommended Operational Guideline of 30-500 mg/L in 1 of 12 treated water samples with a minimum reported value of 22.1 mg/L.

Elevated conductivity is often associated with high hardness levels.

Conductivity exceeded the European Economic Community Aesthetic Guideline Level of 400 umho/cm in 4 of 12 treated water samples with a maximum reported value of 422 umho/cm.

The ODWOs indicate that a hardness level of between 80 and 100 mg/L as calcium carbonate for domestic waters provides an acceptable balance between corrosion and encrustation. Water supplies with a hardness greater than 200 mg/L are considered poor and possess a tendency to form scale deposits and result in excessive soap consumption.

Hardness exceeded the ODWO Recommended Operational Guideline of 80-100 mg/L in 10 of 12 treated water samples with a maximum reported value of 200.6 mg/L.

METALS

At present, there is no evidence that aluminum is physiologically harmful and no health limit for drinking water has been specified. The measure of aluminum in treated water is important to measure the efficiency of the treatment process. The ODWOs indicate that a useful guideline is to maintain a residual below 100 ug/L as aluminum in the water leaving the plant to avoid problems in the distribution system.

Aluminum exceeded the ODWO Recommended Operational Guideline of 100 ug/L in 1 of 12 treated water samples with a maximum reported value of 130 ug/L.

Lead exceeded the ODWO Maximum Acceptable Concentration of 10 ug/L in 1 of 12 treated water samples with a maximum reported value of 21.0 ug/L. The District Officer was notified and a resample was initiated. This lead result was not confirmed by the resample.

ORGANIC

CHLOROAROMATICS

The results of the chloroaromatic scan showed that none were detected above trace levels.

CHLOROPHENOLS

The results of the chlorophenol scan showed that none were detected.

PESTICIDES AND PCB

Atrazine was found at a positive level in 1 of the 11 treated water samples analyzed. The maximum observed level was 580 ng/L. This was below the ODWO Interim Maximum Acceptable Concentration of 60,000 ng/L.

Other pesticides including cyanazine and metolachlor were also detected at trace levels.

PHENOLICS

The results of the phenolic test showed that none were detected above trace levels.

POLYAROMATIC HYDROCARBONS

The results of the polyaromatic hydrocarbon scan showed that none were detected.

SPECIFIC PESTICIDES

The results of the specific pesticide scan showed that one pesticide, dicamba, was detected at a trace level in 2 of 4 treated water samples.

VOLATILES

The detection of benzene, ethylbenzene, toluene and xylenes at low, trace levels may be a laboratory artifact derived from the analytical methodology. Trace levels of styrene are considered to be laboratory artifacts resulting from the sample shipping containers.

Toluene was found at a positive level in 1 of the 12 treated water samples analyzed. The maximum observed level was 0.55 ug/L. This was below the ODWO Aesthetic Objective of 24 ug/L.

Trihalomethanes (THMs) are produced during the water treatment process and will always occur in chlorinated waters. THMs are comprised of chloroform, chlorodibromomethane and dichlorobromomethane. Bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs. Only total THM results are discussed. Starting in 1991, samples from the distribution system were quenched with sodium thiosulphate to stop the further production of THMs in the sample bottle. This provided a more representative estimation of the THMs consumed in tap water.

Total trihalomethanes were found at positive levels in all 12 treated water samples analyzed with a maximum level of 65.1 ug/L. This was below the ODWO Maximum Acceptable Concentration of 350 ug/L.

RADIOLOGICAL

RADIONUCLIDES

There are more than 200 radionuclides, some of which occur naturally and others which originate from the activities of society. The radionuclides currently of greater interest from a health view-point are tritium, strontium-90, iodine-131, cesium-137 and radium-226. The gross beta and gross alpha determinations are suitable for preliminary screening except for tritium which must be measured separately. Radionuclides are measured in becquerels per litre (Bq/L). No results were above the available guidelines.

CONCLUSIONS

Several pesticides were detected indicating that the raw water source may be adversely affected by agricultural activity.

The health related guideline for lead was exceeded in one treated water sample. The District Officer was notified and a resample was initiated. This lead result was not confirmed by the resample.

No other known health related guidelines were exceeded.

The Mitchell's Bay water treatment plant, for the sample years 1991 and 1992, produced acceptable quality water. No samples were taken in the distribution system for this sampling period.

FIGURE 1

MITCHELL S BAY WATER TREATMENT PLANT

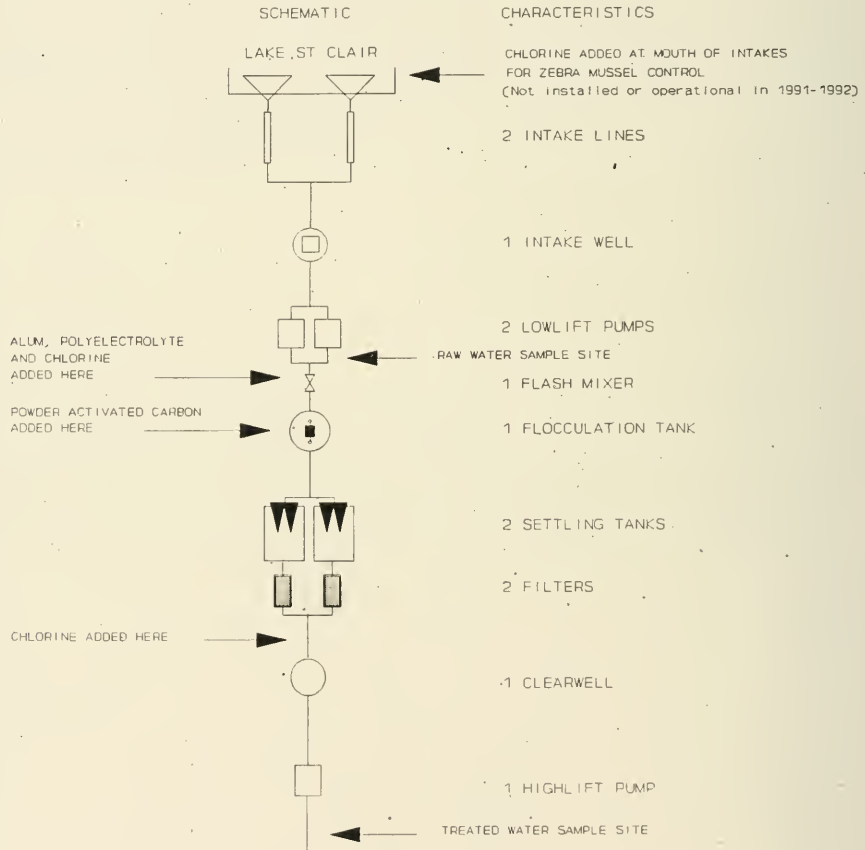


TABLE 1
DRINKING WATER SURVEILLANCE PROGRAM
PLANT GENERAL REPORT

PLANT NAME: MITCHELL'S BAY WTP
WORKS #: 220003234
UTM #: 173839504702600

DISTRICT: WINDSOR
REGION: SOUTHWEST
DISTRICT OFFICER: J. DRUMMOND

SUPERINTENDENT: BOB HEMBER

ADDRESS: MITCHELL'S BAY
c/o WALLACEBURG WPCP
P.O. BOX 250
WALLACEBURG, ONTARIO
N8A 4L6
519-351-3838

MUNICIPALITY: MITCHELL'S BAY
AUTHORITY: PROVINCIAL

PLANT INFORMATION

PLANT VOLUME:	.321	(X 1000 M3)
DESIGN CAPACITY:	1.091	(X 1000 M3/DAY)
RATED CAPACITY:	5.450	(X 1000 M3/DAY)

MUNICIPALITY	POPULATION
-----	-----
MITCHELL'S BAY	350

TABLE 2
DRINKING WATER SURVEILLANCE PROGRAM
IN-PLANT MONITORING

PARAMETER -----	LOCATION -----	FREQUENCY -----
COMBINED CHLORINE RESIDUAL	TREATED	DAILY READING
FREE CHLORINE RESIDUAL	TREATED	DAILY READING
TOTAL CHLORINE RESIDUAL	TREATED	DAILY READING
TEMPERATURE	RAW	DAILY READING
	TREATED	DAILY READING
TURBIDITY	FILTERED	DAILY READING
	RAW	DAILY READING
	SETTLED	DAILY READING
	TREATED	DAILY READING

TABLE 3
DRINKING WATER SURVEILLANCE PROGRAM MITCHELL'S BAY WTP SAMPLE DAY CONDITIONS
AND TREATMENT CHEMICAL DOSAGES FOR 1991 AND 1992

DATE	DELAY * TIME (HRS)	FLOW (1000M3)	COAGULATION ALUM LIQUID	COAGULATION AID POLYELECTROLYTE	TASTE AND ODOR ACTIVATED CARBON POWDER	POST CHLORINATION CHLORINE
91 FEB 19	2.25	.050	65.00	.35	2.40	.70
91 APR 17	3.00	.071	117.00	.39	2.00	.
91 JUN 19	13.50	.200	65.00	.39	2.70	.60
91 AUG 19	.00	.124	32.00 *	.43	3.00	.90
91 OCT 23	.00	.083	52.00	.39	2.50	.
91 NOV 20	.00	.000	32.00	.52	2.30	.80
92 APR 23	2.75	.061	32.00	.45	1.96	2.36
92 JUN 16	9.25	.135	32.00	.45	1.98	.15
92 AUG 17	.00	.122	32.00	.39	2.10	.60
92 OCT 28	1.00	.069	32.00	.39	1.70	.50
92 DEC 15	4.75	.071	78.00	.39	2.82	.50

* THE DELAY TIME BETWEEN THE RAW AND TREATED WATER SAMPLING, SHOULD ESTIMATE THE RETENTION TIME.

KEY TO TABLE 4 and 5

- A ONTARIO DRINKING WATER OBJECTIVES (ODWO)
1. Maximum Acceptable Concentration (MAC)
 - 1+. MAC for Total Trihalomethanes
 2. Interim Maximum Acceptable Concentration (IMAC)
 3. Aesthetic Objective (AO)
 - 3*. AO for Total Xylenes
 4. Recommended Operational Guideline
 5. Health Related Guidance Value
- B HEALTH & WELFARE CANADA (H&W)
1. Maximum Acceptable Concentration (MAC)
 2. Proposed MAC
 3. Interim MAC
 4. Aesthetic Objective (AO)
- C WORLD HEALTH ORGANIZATION (WHO)
1. Guideline Value (GV)
 2. Tentative GV
 3. Aesthetic GV
- D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
 2. Suggested No-Adverse Effect Level (SNAEL)
 3. Lifetime Health Advisory
 4. EPA Ambient Water Quality Criteria
- F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
 2. Aesthetic Guideline Level
 3. Maximum Admissable Concentration (MADC)
- G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE
- I NEW YORK STATE AMBIENT WATER GUIDELINE
- N/A NONE AVAILABLE

LABORATORY RESULTS, REMARK DESCRIPTIONS

. No Sample Taken

BDL Below Minimum Measurement Amount

<T Greater Than Detection Limit But Not Confident
(SEE INTERPRETATION OF RESULTS ABOVE)

> Results Are Greater Than The Upper Limit

<=> Approximate Result

!48 No Data: Sample Age Exceeded 48 Hours

!AR No Data: No Numeric Results

!AW No Data: Analysis Withdrawn

!BT No Data: Sample Broken In Transit

!CS No Data: Contamination Suspected

!EF No Data: Laboratory Equipment Failure

!IR No Data: Insufficient Sample

!IS No Data: Insufficient Sample

!LA No Data: Laboratory Accident

!NP No Data: No Procedure

!NR No Data: Sample Not Received

!OP No Data: Obscured Plate

!PE No Data: Procedure Error: Sample Discarded

!PR No Data: Preservative Required

!QU No Data: Quality Control Unacceptable

!RE No Data: Received Empty

!RO No Data: No Numeric Results

!SM No Data: Sample Missing

!SS No Data: Sample Improperly Preserved

!U No Data: Sample Unsuitable For Analysis

!UB No Data: Bottle Broken

!UN No Data: Result Unreliable

!UR	No Data: Unpreserved Sample Required
A	Approximate Value
A3C	Approximate, Total Count Exceeded 300 Colonies
A>	Approximate Value, Exceeded Normal Range
APS	Additional Peak, Less Than, Not Priority Pollutant
ARO	Additional Information In Laboratory Report
CRO	Calculated Result Only
NAF	Not All Required Tests Found
RID	Ioncal Calculated on Incomplete Data Set
RMP	P and M-Xylene Not Separated
RRR	Result Obtained by Repeat Analysis
RRV	Rerun Verification
SFA	Sample Filtered: Filtrate Analyzed
SIL	Sample Incorrectly Labelled
SPS	Several Peaks, Small, Not Priority Pollutant
U48	Unreliable: Sample Age Exceeded 48 Hours
UAL	Unreliable: Sample Age Exceeded Limit
UAU	Unreliable: Sample Age Unknown
UCS	Unreliable: Contamination Suspected
WSD	Wrong Sample Description On Bottle

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT TREATMENT PLANT
RAW TREATED

BACTERIOLOGICAL

GUIDELINE = 0 (A1)

DET'N LIMIT = 0

FECAL COLIFORM MF (CT/100ML)

1991 FEB	BDL	-
1991 APR	BDL	-
1991 JUN	BDL	-
1991 AUG	0 A3C	-
1991 OCT	BDL	-
1991 NOV	BDL	-
1992 FEB	BDL	-
1992 APR	0	-
1992 JUN	0	-
1992 AUG	0	-
1992 OCT	0	-
1992 DEC	BDL	-

GUIDELINE = 500 (A3)

DET'N LIMIT = 0

STANDARD PLATE CNT MF (CT/ML)

1991 FEB	0 <=>	-
1991 APR	3 <=>	-
1991 AUG	7 <=>	-
1991 OCT	0 <=>	-
1991 NOV	0 <=>	-
1992 FEB	0 <=>	-
1992 APR	0 <=>	-
1992 JUN	2 <=>	-
1992 AUG	0 <=>	-
1992 OCT	1 <=>	-
1992 DEC	3 <=>	-

GUIDELINE = 5/100ML (A1)

DET'N LIMIT = 0

TOTAL COLIFORM MF (CT/100ML)

1991 FEB	170	-
1991 APR	10 <=>	-
1991 JUN	BDL	-
1991 AUG	4 A3C	-
1991 OCT	BDL	-
1991 NOV	BDL	-
1992 FEB	44 A3C	-
1992 APR	16	-
1992 JUN	BDL	-
1992 AUG	BDL	-
1992 OCT	44 A3C	-
1992 DEC	680	-

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	BACTERIOLOGICAL T COLIFORM BCKGRD. MF (CT/100ML)	DET'N LIMIT = 0	GUIDELINE = N/A
1991 FEB		1600		
1991 APR		1400		
1991 JUN		2340		
1991 AUG		9600 >		
1991 OCT		5300 A3C		
1991 NOV		3600 A3C		
1992 FEB		3000 A3C		
1992 APR		1120		
1992 JUN		9600 >		
1992 AUG		9600		
1992 OCT		3400 A3C		
1992 DEC		3400		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	CHEMISTRY (FIELD) (MG/L)	DET'N LIMIT = 0	GUIDELINE = N/A
FLO CHLORINE (COMB) (MG/L)				
1991 FEB		.300		
1991 APR		.000		
1991 JUN		.100		
1991 AUG		.400		
1991 OCT		.100		
1991 NOV		.400		
1992 FEB		.150		
1992 APR		.100		
1992 JUN		.000		
1992 AUG		.000		
1992 OCT		.050		
1992 DEC		.120		
FLO CHLORINE FREE (MG/L)				
1991 FEB		.400		
1991 APR		.000		
1991 JUN		.500		
1991 AUG		.500		
1991 OCT		.600		
1991 NOV		.400		
1992 FEB		.650		
1992 APR		.600		
1992 JUN		.500		
1992 AUG		.600		
1992 OCT		.450		
1992 DEC		.380		
FLO CHLORINE (TOTAL) (MG/L)				
1991 FEB		.700		
1991 APR		.700		
1991 JUN		.600		
1991 AUG		.900		
1991 OCT		.700		
1991 NOV		.800		
1992 FEB		.800		
1992 APR		.700		
1992 JUN		.500		
1992 AUG		.600		
1992 OCT		.500		
1992 DEC		.500		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT		TREATMENT PLANT		DET'N LIMIT = N/A	GUIDELINE = 6.5-8.5 (A4)
RAW	TREATED	RAW	TREATED		
CHEMISTRY (FIELD)					
FLD PH (DMNSLESS)					
1991 FEB	7.100	7.100	7.100		
1991 APR	7.800	7.800	6.700		
1991 JUN	9.000	9.000	6.700		
1991 AUG	9.000	6.400	6.400		
1991 OCT	7.700	6.600	7.000		
1991 NOV	7.500	7.500	7.000		
1992 FEB	7.120	7.120			
1992 APR	7.450	6.390			
1992 JUN	7.580	7.300			
1992 AUG	8.300	7.700			
1992 OCT	7.800	7.600			
1992 DEC	7.910	7.490			
FLD TEMPERATURE (DEG.C)				DET'N LIMIT = N/A	GUIDELINE = 15 (A3)
1991 FEB	7.700	11.300			
1991 APR	11.300	15.000			
1991 JUN	23.500	24.600			
1991 AUG	24.600	23.500			
1991 OCT	13.600	16.800			
1991 NOV	12.400	15.700			
1992 APR	11.000	13.300			
1992 JUN	21.400	22.000			
1992 AUG	20.000	21.600			
1992 OCT	14.000	12.000			
1992 DEC	7.100	9.900			
FLD TURBIDITY (FTU)				DET'N LIMIT = N/A	GUIDELINE = 1.0 (A1)
1991 FEB	16.700	.140			
1991 APR	17.000	.490			
1991 JUN	1.700	.140			
1991 AUG	1.500	.140			
1991 OCT	2.000	.080			
1991 NOV	11.600	.120			
1992 FEB	9.500	.180			
1992 APR	6.000	.100			
1992 JUN	1.300	.150			
1992 AUG	2.800	.120			
1992 OCT	18.000	.140			
1992 DEC	18.900	.250			

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED		DET'N LIMIT = 0.2	GUIDELINE = 30-500 (A4)
CHEMISTRY (LABORATORY)					
ALKALINITY (MG/L)					
1991 FEB	140.900	109.200			
1991 APR	148.400	93.600			
1991 JUN	57.700	22.100			
1991 AUG	57.400	30.500			
1991 OCT	99.000	66.000			
1991 NOV	96.600	69.000			
1992 FEB	103.800	83.600			
1992 APR	106.900	72.100			
1992 JUN	75.300	54.200			
1992 AUG	79.700	39.800			
1992 OCT	152.700	122.600			
1992 DEC	141.500	99.200			
CALCIUM (MG/L)				DET'N LIMIT = 0.20	GUIDELINE = 100 (F2)
1991 FEB	57.600	59.000			
1991 APR	58.000	56.600			
1991 JUN	19.400	21.000			
1991 AUG	16.200	17.400			
1991 OCT	32.600	33.800			
1991 NOV	36.400	34.000			
1992 FEB	35.400	40.200			
1992 APR	42.100	41.750			
1992 JUN	31.100	31.700			
1992 AUG	27.500	25.700			
1992 OCT	59.900	58.800			
1992 DEC	52.900	52.100			
CYANIDE (MG/L)				DET'N LIMIT = 0.001	GUIDELINE = 0.2 (A1)
18 SAMPLES	BDL	BDL			

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	
CHEMISTRY (LABORATORY)			
CHLORIDE (MG/L)		DET'N LIMIT = 0.20	GUIDELINE = 250 (A3)
1991 FEB	19,500	21,700	
1991 APR	20,200	20,700	
1991 JUN	13,500	15,100	
1991 AUG	10,200	11,800	
1991 OCT	9,200	11,000	
1991 NOV	12,000	12,000	
1992 FEB	14,400	9,100	
1992 APR	18,200	18,900	
1992 JUN	12,800	15,300	
1992 AUG	13,900	14,800	
1992 OCT	19,900	21,600	
1992 DEC	17,800	20,000	
COLOUR (HZU)			
		DET'N LIMIT = 0.50	GUIDELINE = 5 (A3)
1991 FEB	9,000	1,500 <T	
1991 APR	8,000	1,500 <T	
1991 JUN	5,500	1,500	
1991 AUG	5,000	1,000 <T	
1991 OCT	3,000	1,000	
1991 NOV	1,000	1,000	
1992 FEB	1,000	1,000 <T	
1992 APR	4,500	BDL	
1992 JUN	3,000	1,000	
1992 AUG	11,500	2,000	
1992 OCT	29,500	3,000	
1992 DEC	11,000	1,000	
CONDUCTIVITY (UMHO/CM)			
		DET'N LIMIT = 1.0	GUIDELINE = 400 (F2)
1991 FEB	397	421	
1991 APR	411	415	
1991 JUN	210	238	
1991 AUG	172	193	
1991 OCT	251	272	
1991 NOV	255	274	
1992 FEB	300	321	
1992 APR	339	350	
1992 JUN	272	282	
1992 AUG	251	256	
1992 OCT	417	422	
1992 DEC	389	416	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT		CHEMISTRY (LABORATORY)		DET'N LIMIT = 0.10		GUIDELINE = 5.0 (A3)	
RAW	TREATED	DISS ORG CARBON (MG/L)					
1991 FEB		2.700					
1991 APR		3.100					
1991 JUN		2.800					
1991 AUG		2.500					
1991 OCT		2.000					
1991 NOV		1.700					
1992 FEB		1.700					
1992 APR		2.400					
1992 JUN		2.000					
1992 AUG		3.800					
1992 OCT		5.000					
1992 DEC		3.100					
FLUORIDE (MG/L)				DET'N LIMIT = 0.01		GUIDELINE = 1.5 (A1)	
1991 FEB		.120					
1991 APR		.120					
1991 JUN		.100					
1991 AUG		.080					
1991 OCT		.140					
1991 NOV		.100					
1992 FEB		.100					
1992 APR		.120					
1992 JUN		.080					
1992 AUG		.080					
1992 OCT		.140					
1992 DEC		.100					
HARDNESS (MG/L)				DET'N LIMIT = 0.5		GUIDELINE = 80-100 (A4)	
1991 FEB		196.500					
1991 APR		197.000					
1991 JUN		86.000					
1991 AUG		73.000					
1991 OCT		114.600					
1991 NOV		125.000					
1992 FEB		127.000					
1992 APR		148.000					
1992 JUN		117.000					
1992 AUG		103.300					
1992 OCT		203.000					
1992 DEC		182.270					

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT
RAW

TREATMENT PLANT
TREATED

CHEMISTRY (LABORATORY)

DET'N LIMIT = N/A

GUIDELINE = N/A

IONCAL (OMNSLESS)

1991 FEB 2.760 1.809
1991 APR .026 NAF .159 NAF
1991 JUN 3.701 NAF .842 NAF
1991 AUG 4.599 3.721
1991 OCT 2.040 2.098
1991 NOV 4.187 2.970 NAF
1992 FEB 4.202 1.554
1992 APR 4.480 4.730
1992 JUN 1.514 NAF .548 NAF
1992 AUG 3.563 2.084
1992 OCT 1.174 1.843
1992 DEC 3.342 4.942

POTASSIUM (MG/L)

DET'N LIMIT = 0.01

GUIDELINE = 10 (FZ)

1991 FEB 1.840 1.820
1991 APR 2.000 1.900
1991 JUN .600 .650
1991 AUG .300 .350
1991 OCT 1.840 1.940
1991 NOV 1.500 1.460
1992 FEB 1.370 1.350
1992 APR 1.471 1.493
1992 JUN 1.060 1.060
1992 AUG 1.107 .969
1992 OCT 3.785 3.449
1992 DEC 2.598 2.253

LANGELIERS INDEX (OMNSLESS)

DET'N LIMIT = N/A

GUIDELINE = N/A

1991 FEB .729 .206
1991 APR .933 .062
1991 JUN .735 1.258
1991 AUG .569 -1.312
1991 OCT .369 -.430
1991 NOV .185 -.128
1992 FEB .536 .013
1992 APR .498 -.168
1992 JUN .071 -.497
1992 AUG .601 -.622
1992 OCT .759 .405
1992 DEC .674 .051

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	CHEMISTRY (LABORATORY)		DET'N LIMIT = 0.1	GUIDELINE = 30.0 (F2)
		MAGNESIUM (MG/L)			
1991 FEB		12.800	12.950		
1991 APR		12.700	12.300		
1991 JUN		9.100	10.200		
1991 AUG		7.900	8.000		
1991 OCT		8.100	8.250		
1991 NOV		8.300	8.000		
1992 FEB		9.290	9.710		
1992 APR		10.480	10.350		
1992 JUN		9.490	9.900		
1992 AUG		8.390	9.870		
1992 OCT		12.980	12.400		
1992 DEC		12.180	11.760		
		GUIDELINE = 200 (A4)			
		SODIUM (MG/L)		DET'N LIMIT = 0.20	
1991 FEB		8.200	8.300		
1991 APR		9.400	8.800		
1991 JUN		7.800	7.000		
1991 AUG		6.000	5.800		
1991 OCT		5.900	5.900		
1991 NOV		6.200	6.200		
1992 FEB		8.240	8.350		
1992 APR		8.850	8.650		
1992 JUN		7.010	7.280		
1992 AUG		6.700	6.540		
1992 OCT		7.930	8.140		
1992 DEC		7.320	9.420		
		GUIDELINE = 0.05 (F2)			
		AMMONIUM TOTAL (MG/L)		DET'N LIMIT = 0.002	
1991 FEB		.018	BDL		
1991 APR		.004 <T	.004 <T		
1991 JUN		.016	.004 <T		
1991 AUG		.004 <T	BDL		
1991 OCT		BDL	BDL		
1991 NOV		.032	BDL		
1992 FEB		.020	BDL		
1992 APR		.010	.004 <T		
1992 JUN		.028	.004 <T		
1992 AUG		.006 <T	.002 <T		
1992 OCT		.052	.004 <T		
1992 DEC		.034	.010		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT
RAW

TREATMENT PLANT
TREATED

CHEMISTRY (LABORATORY)

GUIDELINE = 1.0 (A1)

DET'N LIMIT = 0.001

NITRITE (MG/L)

1991 FEB .008 BDL
1991 APR .013 .001 <T
1991 JUN .010 BDL
1991 AUG .001 <T BDL
1991 OCT .004 <T BDL
1991 NOV .004 <T BDL
1992 FEB .006 BDL
1992 APR .011 .002 <T
1992 JUN .009 BDL
1992 AUG .006 BDL
1992 OCT .028 .001 <T
1992 DEC .019 .002 <T

NITRATE (TOTAL) (MG/L)

DET'N LIMIT = 0.005

GUIDELINE = 10.0 (A1)

1991 FEB 2.090
1991 APR 2.560
1991 JUN 1.060
1991 AUG .045
1991 OCT .145
1991 NOV .345
1992 FEB 1.020
1992 APR 2.520
1992 JUN .925
1992 AUG .330
1992 OCT 2.820
1992 DEC 1.980

NITROGEN TOT KJELD (MG/L)

DET'N LIMIT = 0.02

GUIDELINE = N/A

1991 FEB .420
1991 APR .360
1991 JUN .330
1991 AUG .210
1991 OCT .240
1991 NOV .280
1992 FEB .200
1992 APR .320
1992 JUN .360
1992 AUG .380
1992 OCT .660
1992 DEC .540

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

PH (DIMENSIONLESS)	CHEMISTRY (LABORATORY)		DET'N LIMIT = N/A	GUIDELINE = 6.5-8.5 (A4)
	TREATMENT PLANT RAW	TREATMENT PLANT TREATED		
1991 FEB	8.270	7.850		
1991 APR	8.450	7.790		
1991 JUN	9.090	7.490		
1991 AUG	8.990	7.360		
1991 OCT	8.280	7.650		
1991 NOV	8.060	7.930		
1992 FEB	8.410	7.930		
1992 APR	8.290	7.800		
1992 JUN	8.130	7.700		
1992 AUG	8.680	7.790		
1992 OCT	8.250	8.000		
1992 DEC	8.250	7.790		
PHOSPHORUS FIL REACT (MG/L)				
1991 FEB	.005	.001 <T	DET'N LIMIT = 0.0005	GUIDELINE = N/A
1991 APR	.005	.002 <T		
1991 JUN	.004	.000 <T		
1991 AUG	.000 <T	BOL		
1991 OCT	.001 <T	BOL		
1991 NOV	.002 <T	.000 <T		
1992 FEB	.002 <T	BOL		
1992 APR	.002 <T	BOL		
1992 JUN	.001 <T	BOL		
1992 AUG	.001 <T	BOL		
1992 OCT	.006	BOL		
1992 DEC	.011	BOL		
PHOSPHORUS TOTAL (MG/L)				
1991 FEB	.015	.003 <T	DET'N LIMIT = 0.002	GUIDELINE = 0.40 (F2)
1991 APR	.012	BOL		
1991 JUN	.013	.051		
1991 AUG	.009 <T	BOL		
1991 OCT	.064	BOL		
1991 NOV	.008 <T	.004 <T		
1992 FEB	.006 <T	.003 <T		
1992 APR	.014	BOL		
1992 JUN	.017	.003 <T		
1992 AUG	.011	.002 <T		
1992 OCT	.036	.005 <T		
1992 DEC	.025	BOL		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	CHEMISTRY (LABORATORY) RESIDUE FILTRATE (MG/L)	DET'N LIMIT = N/A	GUIDELINE = 500 (A3)
1991 FEB	258.000 CRO	274.000 CRO		
1991 APR	267.000 CRO	270.000 CRO		
1991 JUN	137.000 CRO	155.000 CRO		
1991 AUG	112.000 CRO	125.000 CRO		
1991 OCT	165.000 CRO	177.000 CRO		
1991 NOV	166.000 CRO	178.000 CRO		
1992 FEB	195.000 CRO	209.000 CRO		
1992 APR	220.000 CRO	227.000 CRO		
1992 JUN	177.000 CRO	183.000 CRO		
1992 AUG	163.000 CRO	166.000 CRO		
1992 OCT	271.000 CRO	274.000 CRO		
1992 DEC	253.000	270.000		
SULPHATE (MG/L)			DET'N LIMIT = 0.20	GUIDELINE = 500 (A3)
1991 FEB	33.600	66.680		
1991 APR	32.660	79.840		
1991 JUN	25.340	62.050		
1991 AUG	17.250	63.640		
1991 OCT	19.210	52.270		
1991 NOV	19.320	40.530		
1992 FEB	23.680	54.960		
1992 APR	33.950	65.640		
1992 JUN	37.180	55.620		
1992 AUG	21.840	53.440		
1992 OCT	35.530	59.020		
1992 DEC	33.200	73.600		
TURBIDITY (FTU)			DET'N LIMIT = 0.05	GUIDELINE = 1.0 (A1)
1991 FEB	6.500 RRV	.220		
1991 APR	9.300	.750		
1991 JUN	.770	.230		
1991 AUG	1.800	.240		
1991 OCT	5.000	.150 <†		
1991 NOV	6.000	.240 <†		
1992 FEB	4.300	.170 <†		
1992 APR	6.200	.290		
1992 JUN	4.200	.200 <†		
1992 AUG	1.820	.200 <†		
1992 OCT	17.200	.280		
1992 DEC	15.900	.310		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED		GUIDELINE = N/A	
METALS		METALS		GUIDELINE = 100 (A4)	
SILVER (UG/L)		SILVER (UG/L)		DET'N LIMIT = 0.05	
1991 FEB	BDL	1991 FEB	BDL		
1991 APR	BDL	1991 APR	BDL		
1991 JUN	BDL	1991 JUN	.360 <T		
1991 AUG	BDL	1991 AUG	BDL		
1991 OCT	BDL	1991 OCT	BDL		
1991 NOV	BDL	1991 NOV	BDL		
1992 FEB	BDL	1992 FEB	BDL		
1992 APR	BDL	1992 APR	BDL		
1992 JUN	BDL	1992 JUN	BDL		
1992 AUG	BDL	1992 AUG	BDL		
1992 OCT	BDL	1992 OCT	BDL		
1992 DEC	BDL	1992 DEC	BDL		
ALUMINUM (UG/L)		ALUMINUM (UG/L)		DET'N LIMIT = 0.10	
1991 FEB	140.000	1991 FEB	30.000		
1991 APR	130.000	1991 APR	130.000		
1991 JUN	46.000	1991 JUN	43.000		
1991 AUG	52.000	1991 AUG	18.000		
1991 OCT	41.000	1991 OCT	13.000		
1991 NOV	110.000	1991 NOV	17.000		
1992 FEB	96.000	1992 FEB	17.000		
1992 APR	150.000	1992 APR	10.000		
1992 JUN	680.000	1992 JUN	17.000		
1992 AUG	190.000	1992 AUG	16.000		
1992 OCT	330.000	1992 OCT	23.000		
1992 DEC	620.000	1992 DEC	41.000		
ARSENIC (UG/L)		ARSENIC (UG/L)		DET'N LIMIT = 0.10	
1991 FEB	.530 <T	1991 FEB	.240 <T		
1991 APR	.330 <T	1991 APR	BDL		
1991 JUN	.760 <T	1991 JUN	.170 <T		
1991 AUG	.880 <T	1991 AUG	.470 <T		
1991 OCT	.450 <T	1991 OCT	.270 <T		
1991 NOV	.450 <T	1991 NOV	.270 <T		
1992 FEB	.230 <T	1992 FEB	BDL		
1992 APR	.490 <T	1992 APR	BDL		
1992 JUN	.640 <T	1992 JUN	.370 <T		
1992 AUG	1.300	1992 AUG	.390 <T		
1992 OCT	.770 <T	1992 OCT	.590 <T		
1992 DEC	.580 <T	1992 DEC	.130 <T		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	
METALS			
BARIUM (UG/L)		DET'N LIMIT = 0.05	
		GUIDELINE = 1000 (A2)	
1991 FEB	21.000	18.000	
1991 APR	26.000	24.000	
1991 JUN	11.000	13.000	
1991 AUG	10.000	11.000	
1991 OCT	16.000	17.000	
1991 NOV	18.000	17.000	
1992 FEB	18.000	17.000	
1992 APR	18.000	17.000	
1992 JUN	13.000	14.000	
1992 AUG	15.000	15.000	
1992 OCT	28.000	23.000	
1992 DEC	22.000	19.000	
BORON (UG/L)		DET'N LIMIT = 2.00	
		GUIDELINE = 5000 (A1)	
1991 FEB	24.000	23.000	
1991 APR	41.000	37.000	
1991 JUN	21.000	22.000	
1991 AUG	18.000 <T	19.000 <T	
1991 OCT	18.000 <T	15.000 <T	
1991 NOV	19.000 <T	25.000	
1992 FEB	17.000 <T	18.000 <T	
1992 APR	21.000	20.000 <T	
1992 JUN	19.000 <T	22.000	
1992 AUG	43.000	36.000	
1992 OCT	34.000	30.000	
1992 DEC	24.000	24.000	
BERYLLIUM (UG/L)		DET'N LIMIT = 0.05	
		GUIDELINE = 6800 (D4)	
1991 FEB	BOL	BOL	
1991 APR	BOL	BOL	
1991 JUN	BOL	BOL	
1991 AUG	BOL	.070 <T	
1991 OCT	BOL	BOL	
1991 NOV	BOL	BOL	
1992 FEB	.060 <T	.140 <T	
1992 APR	BOL	BOL	
1992 JUN	BOL	BOL	
1992 AUG	.070 <T	BOL	
1992 OCT	BOL	BOL	
1992 DEC	BOL	BOL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT
RAW

TREATMENT PLANT
TREATED

METALS

CADMIUM (UG/L)

OET'N LIMIT = 0.05

GUIDELINE = 5.0 (A1)

1991 FEB	BDL	BDL
1991 APR	BDL	BDL
1991 JUN	BDL	BDL
1991 AUG	BDL	BDL
1991 OCT	BDL	BDL
1991 NOV	BDL	.400 <T
1992 FEB	BDL	.070 <T
1992 APR	BDL	BDL
1992 JUN	BDL	BDL
1992 AUG	BDL	BDL
1992 OCT	BDL	BDL
1992 DEC	BDL	BDL

COBALT (UG/L)

OET'N LIMIT = 0.02

GUIDELINE = N/A

1991 FEB	.300 <T	.360 <T
1991 APR	.170 <T	.100 <T
1991 JUN	.100 <T	.140 <T
1991 AUG	.100 <T	.110 <T
1991 OCT	.190 <T	.140 <T
1991 NOV	.110 <T	.110 <T
1992 FEB	.180 <T	.180 <T
1992 APR	.260 <T	.230 <T
1992 JUN	.220 <T	.160 <T
1992 AUG	.210 <T	.160 <T
1992 OCT	.880 <T	.660 <T
1992 DEC	.160 <T	.070 <T

CHROMIUM (UG/L)

OET'N LIMIT = 0.50

GUIDELINE = 50.0 (A1)

1991 FEB	2.000 <T	1.400 <T
1991 APR	5.300	4.200 <T
1991 JUN	1.100 <T	BDL
1991 AUG	.810 <T	.660 <T
1991 OCT	2.200 <T	BDL
1991 NOV	.660 <T	2.300 <T
1992 FEB	BDL	BDL
1992 APR	1.200 <T	.690 <T
1992 JUN	.730 <T	.750 <T
1992 AUG	2.100 <T	1.300 <T
1992 OCT	3.400 <T	BDL
1992 DEC	4.100 <T	3.000 <T

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT
RAW

TREATMENT PLANT
TREATED

METALS

DET'N LIMIT = 0.50

GUIDELINE = 1000 (A3)

COPPER (UG/L)	
1991 FEB	1,700 <T
1991 APR	1,900 <T
1991 JUN	1,400 <T
1991 AUG	2,000 <T
1991 OCT	1,800 <T
1991 NOV	2,400 <T
1992 FEB	2,500 <T
1992 APR	1,300 <T
1992 JUN	3,100 <T
1992 AUG	2,900 <T
1992 OCT	20,000
1992 DEC	2,100 <T

IRON (UG/L)

DET'N LIMIT = 6.00

GUIDELINE = 300 (A3)

1991 FEB	120,000
1991 APR	180,000
1991 JUN	30,000 <T
1991 AUG	33,000 <T
1991 OCT	58,000 <T
1991 NOV	120,000
1992 FEB	87,000
1992 APR	110,000
1992 JUN	47,000 <T
1992 AUG	60,000 <T
1992 OCT	390,000
1992 DEC	210,000

MERCURY (UG/L)

DET'N LIMIT = 0.02

GUIDELINE = 1.0 (A1)

24 SAMPLES	BOL	BOL
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TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED		METALS ()		GUIDELINE = 50.0 (A3)	
						DET'N LIMIT = 0.05	
MANGANESE (UG/L)							
1991 FEB	6.900	1991 FEB	6.100				
1991 APR	9.700	1991 APR	10.000				
1991 JUN	2.200	1991 JUN	4.300				
1991 AUG	2.300	1991 AUG	4.300				
1991 OCT	3.000	1991 OCT	3.500				
1991 NOV	5.000	1991 NOV	6.000				
1992 FEB	5.900	1992 FEB	5.700				
1992 APR	4.700	1992 APR	4.000				
1992 JUN	3.500	1992 JUN	4.900				
1992 AUG	5.600	1992 AUG	4.100				
1992 OCT	5.800	1992 OCT	2.500				
1992 DEC	7.400	1992 DEC	3.700				
MOLYBDENUM (UG/L)						GUIDELINE = N/A	
						DET'N LIMIT = 0.05	
1991 FEB	.760	1991 FEB	.940				
1991 APR	.990	1991 APR	1.100				
1991 JUN	1.100	1991 JUN	.890				
1991 AUG	.590	1991 AUG	.530				
1991 OCT	.600	1991 OCT	.550				
1991 NOV	.680	1991 NOV	.710				
1992 FEB	.270 <T	1992 FEB	.460 <T				
1992 APR	1.100	1992 APR	1.000				
1992 JUN	1.100	1992 JUN	1.200				
1992 AUG	1.200	1992 AUG	1.200				
1992 OCT	.720	1992 OCT	1.200				
1992 DEC	.560	1992 DEC	.850				
NICKEL (UG/L)						GUIDELINE = 350 (03)	
						DET'N LIMIT = 0.20	
1991 FEB	1.900 <T	1991 FEB	1.700 <T				
1991 APR	.360 <T	1991 APR	.510 <T				
1991 JUN	BOL	1991 JUN	BOL				
1991 AUG	.740 <T	1991 AUG	.580 <T				
1991 OCT	.820 <T	1991 OCT	.520 <T				
1991 NOV	BOL	1991 NOV	.450 <T				
1992 FEB	1.700 <T	1992 FEB	1.300 <T				
1992 APR	2.000 <T	1992 APR	2.300				
1992 JUN	.990 <T	1992 JUN	.910 <T				
1992 AUG	.910 <T	1992 AUG	.710 <T				
1992 OCT	3.100	1992 OCT	2.300				
1992 DEC	1.900 <T	1992 DEC	1.600 <T				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WIP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	
LEAD (UG/L)		METALS	
		DET'N LIMIT = 0.05	
		GUIDELINE = 10 (A1)	
1991 FEB	.230 <T	.330 <T	
1991 APR	.510	21,000 RRV	
1991 JUN	.140 <T	1,300	
1991 AUG	.610	.850	
1991 OCT	.360 <T	.340 <T	
1991 NOV	.490 <T	.510	
1992 FEB	.290 <T	.220 <T	
1992 APR	.250 <T	.490 <T	
1992 JUN	.400 <T	.390 <T	
1992 AUG	.820	.700	
1992 OCT	1,100	.310 <T	
1992 DEC	.520	.410 <T	
ANTIMONY (UG/L)		DET'N LIMIT = 0.05	
		GUIDELINE = 146 (D4)	
1991 FEB	.360 <T	.390 <T	
1991 APR	.550	.520	
1991 JUN	.540	.530	
1991 AUG	.460 <T	.410 <T	
1991 OCT	.600	.470 <T	
1991 NOV	.550	.480 <T	
1992 FEB	.420 <T	.330 <T	
1992 APR	.400 <T	.510	
1992 JUN	.300 <T	.440 <T	
1992 AUG	.400 <T	.390 <T	
1992 OCT	.260 <T	.470 <T	
1992 DEC	.340 <T	.390 <T	
SELENIUM (UG/L)		DET'N LIMIT = 1.00	
		GUIDELINE = 10 (A1)	
1991 FEB	BOL	BOL	
1991 APR	2,000 <T	4,000 <T	
1991 JUN	BOL	1,600 <T	
1991 AUG	BOL	BOL	
1991 OCT	BOL	BOL	
1991 NOV	BOL	1,700 <T	
1992 FEB	BOL	BOL	
1992 APR	BOL	BOL	
1992 JUN	BOL	BOL	
1992 AUG	BOL	BOL	
1992 OCT	BOL	BOL	
1992 DEC	BOL	BOL	

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT
RAWTREATMENT PLANT
TREATED

METALS

STRONTIUM (UG/L)

DET'N LIMIT = 0.10

GUIDELINE = N/A

1991 FEB 160.000 170.000
 1991 APR 190.000 180.000
 1991 JUN 100.000 110.000
 1991 AUG 88.000 93.000
 1991 OCT 110.000 110.000
 1991 NOV 130.000 130.000
 1992 FEB 140.000 130.000
 1992 APR 130.000 130.000
 1992 JUN 110.000 120.000
 1992 AUG 120.000 120.000
 1992 OCT 170.000 160.000
 1992 DEC 160.000 150.000

TITANIUM (UG/L)

DET'N LIMIT = 0.50

GUIDELINE = N/A

1991 FEB 5.700 3.200 <T
 1991 APR 7.600 5.700
 1991 JUN 1.300 <T .900 <T
 1991 AUG 1.100 <T .760 <T
 1991 OCT 1.100 <T BDL
 1991 NOV 2.100 <T 1.100 <T
 1992 FEB 1.600 <T .550 <T
 1992 APR 5.800 5.100
 1992 JUN 4.400 <T 3.300 <T
 1992 AUG 7.500 3.700 <T
 1992 OCT 16.000 8.800
 1992 DEC 3.100 <T 1.900 <T

THALLIUM (UG/L)

DET'N LIMIT = 0.05

GUIDELINE = 13 (D4)

24 SAMPLES BDL BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	
URANIUM (UG/L)		ZINC (UG/L)	
METALS		METALS	
1991 FEB		1991 FEB	
1991 APR		1991 APR	
1991 JUN		1991 JUN	
1991 AUG		1991 AUG	
1991 OCT		1991 OCT	
1991 NOV		1991 NOV	
1992 FEB		1992 FEB	
1992 APR		1992 APR	
1992 JUN		1992 JUN	
1992 AUG		1992 AUG	
1992 OCT		1992 OCT	
1992 DEC		1992 DEC	
VANADIUM (UG/L)		ZINC (UG/L)	
1991 FEB		1991 FEB	
1991 APR		1991 APR	
1991 JUN		1991 JUN	
1991 AUG		1991 AUG	
1991 OCT		1991 OCT	
1991 NOV		1991 NOV	
1992 FEB		1992 FEB	
1992 APR		1992 APR	
1992 JUN		1992 JUN	
1992 AUG		1992 AUG	
1992 OCT		1992 OCT	
1992 DEC		1992 DEC	

GUIDELINE = 100 (A1)

DET'N LIMIT = 0.05

GUIDELINE = N/A

DET'N LIMIT = 0.05

GUIDELINE = 5000 (A3)

DET'N LIMIT = 0.20

TREATMENT PLANT
RAW

TREATMENT PLANT
TREATED

CHLORAROMATICS

GUIDELINE = 450 (D4)

DET'N LIMIT = 1,000

HEXACHLOROBUTADIENE (NG/L)

BDL

BDL

GUIDELINE = N/A

DET'N LIMIT = 5,000

123-TRICHLOROBENZENE (NG/L)

BDL

BDL

GUIDELINE = N/A

DET'N LIMIT = 1,000

1234-TETCHLOROBENZENE (NG/L)

BDL

BDL

GUIDELINE = N/A

DET'N LIMIT = 1,000

1235-TETCHLOROBENZENE (NG/L)

BDL

BDL

GUIDELINE = 10000 (I)

DET'N LIMIT = 5,000

124-TRICHLOROBENZENE (NG/L)

BDL

BDL

GUIDELINE = 38000 (D4)

DET'N LIMIT = 1,000

1245-TETCHLOROBENZENE (NG/L)

BDL

BDL

GUIDELINE = N/A

DET'N LIMIT = 5,000

135-TRICHLOROBENZENE (NG/L)

BDL

BDL

GUIDELINE = 10 (C1)

DET'N LIMIT = 1,000

HEXACHLOROBENZENE (NG/L)

BDL

BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT
RAW

TREATMENT PLANT
TREATED

CHLOROAROMATICS

GUIDELINE = 1900 (D4)

DET'N LIMIT = 1,000

HEXACHLORETHANE (NG/L)

1991 FEB BDL
1991 APR BDL
1991 JUN BDL
1991 AUG IAW
1991 OCT BDL
1991 NOV BDL
1992 FEB BDL
1992 APR BDL
1992 JUN BDL
1992 AUG BDL
1992 OCT BDL
1992 DEC BDL

BDL
BDL
BDL
IAW
BDL
BDL
1,000 <T
4,000 <T
1,000 <T
BDL
BDL
BDL

GUIDELINE = N/A

DET'N LIMIT = 1,000

OCTACHLOROSTYRENE (NG/L)

22 SAMPLES BDL

GUIDELINE = 74000 (D4)

DET'N LIMIT = 1,000

PENTACHLOROBENZENE (NG/L)

22 SAMPLES BDL

GUIDELINE = N/A

DET'N LIMIT = 5,000

236-TRICHLOROTOLUENE (NG/L)

22 SAMPLES BDL

GUIDELINE = N/A

DET'N LIMIT = 5,000

245-TRICHLOROTOLUENE (NG/L)

22 SAMPLES BDL

GUIDELINE = N/A

DET'N LIMIT = 5,000

26A-TRICHLOROTOLUENE (NG/L)

22 SAMPLES BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	CHLOROPHENOLS (NG/L)	DET'N LIMIT	GUIDELINE
234-TRICHLOROPHENOL			100.0	N/A
7 SAMPLES	BDL	BDL		
2345-TETACHLOROPHENOL			20.0	N/A
7 SAMPLES	BDL	BDL		
2356-TETACHLOROPHENOL			10.0	N/A
7 SAMPLES	BDL	BDL		
245-TRICHLOROPHENOL			100.0	2600000 (D4)
7 SAMPLES	BDL	BDL		
246-TRICHLOROPHENOL			20.0	5000 (A1)
7 SAMPLES	BDL	BDL		
PENTACHLOROPHENOL			10.00	60000 (A1)
5 SAMPLES	BDL	BDL		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	PESTICIDES AND PCB	DET'N LIMIT = 1.000	GUIDELINE = 700 (A1)
ALDRIN (NG/L)				
22 SAMPLES	BDL			
ALPHA BHC (NG/L)				
1991 FEB	1.000 <T			
1991 APR	BDL			
1991 JUN	BDL			
1991 AUG	1AW			
1991 OCT	BDL			
1991 NOV	BDL			
1992 FEB	1.000 <T			
1992 APR	BDL			
1992 JUN	BDL			
1992 AUG	BDL			
1992 OCT	1.000 <T			
1992 DEC	1.000 <T			
BETA BHC (NG/L)			DET'N LIMIT = 1.00	GUIDELINE = 300 (G)
22 SAMPLES	BDL			
LINDANE (GAMMA BHC) (NG/L)			DET'N LIMIT = 1.000	GUIDELINE = 4000 (A1)
22 SAMPLES	BDL			
ALPHA CHLORDANE (NG/L)			DET'N LIMIT = 2.000	GUIDELINE = 7000 (A1)
22 SAMPLES	BDL			
GAMMA CHLORDANE (NG/L)			DET'N LIMIT = 2.00	GUIDELINE = 7000 (A1)
22 SAMPLES	BDL			
DIELORIN (NG/L)			DET'N LIMIT = 2.00	GUIDELINE = 700 (A1)
22 SAMPLES	BDL			
METHOXYCHLOR (NG/L)			DET'N LIMIT = 5.0	GUIDELINE = 900000 (A1)
22 SAMPLES	BDL			
ENDOSULFAN 1 (NG/L)			DET'N LIMIT = 2.00	GUIDELINE = 74000 (D4)
22 SAMPLES	BDL			

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

PESTICIDES AND PCB			
ENDOSULFAN II (NG/L)		DET'N LIMIT = 5.000	GUIDELINE = 74000 (D4)
22 SAMPLES	BDL		
ENDRIN (NG/L)		DET'N LIMIT = 5.000	GUIDELINE = 1600 (D3)
22 SAMPLES	BDL		
ENDOSULFAN SULPHATE (NG/L)		DET'N LIMIT = 5.00	GUIDELINE = N/A
22 SAMPLES	BDL		
HEPTACHLOR EPOXIDE (NG/L)		DET'N LIMIT = 1.000	GUIDELINE = 3000 (A1)
14 SAMPLES	BDL		
HEPTACHLOR (NG/L)		DET'N LIMIT = 1.000	GUIDELINE = 3000 (A1)
22 SAMPLES	BDL		
MIREX (NG/L)		DET'N LIMIT = 5.000	GUIDELINE = N/A
22 SAMPLES	BDL		
OXYCHLORDANE (NG/L)		DET'N LIMIT = 2.000	GUIDELINE = N/A
22 SAMPLES	BDL		
O,P-DDT (NG/L)		DET'N LIMIT = 5.000	GUIDELINE = 30000 (A1)
22 SAMPLES	BDL		
PCB (NG/L)		DET'N LIMIT = 20.00	GUIDELINE = 3000 (A2)
22 SAMPLES	BDL		
P,P-DDD (NG/L)		DET'N LIMIT = 5.000	GUIDELINE = 30000 (A1)
22 SAMPLES	BDL		
P,P-DDE (NG/L)		DET'N LIMIT = 1.000	GUIDELINE = 30000 (A1)
22 SAMPLES	BDL		
P,P-DDT (NG/L)		DET'N LIMIT = 5.000	GUIDELINE = 30000 (A1)
22 SAMPLES	BDL		

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TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	

TOXAPHENE (NG/L)		PESTICIDES AND PCB	
DET'N LIMIT = 500.0		GUIDELINE = 5000 (A1)	

20 SAMPLES	BDL	BDL	

AMETRIE (NG/L)		DET'N LIMIT = 50.0	
GUIDELINE = 300000 (D3)			

22 SAMPLES	BDL	BDL	

ATRAZINE (NG/L)		DET'N LIMIT = 50.0	
GUIDELINE = 60000 (A2)			

1991 FEB	280.000 <T	240.000 <T	
1991 APR	150.000 <T	140.000 <T	
1991 JUN	300.000 <T	580.000	
1991 AUG	IAW	IAW	
1991 OCT	BDL	BDL	
1991 NOV	BDL	BDL	
1992 FEB	BDL	BDL	
1992 APR	90.000 <T	70.000 <T	
1992 JUN	240.000 <T	170.000 <T	
1992 AUG	330.000 <T	240.000 <T	
1992 OCT	270.000 <T	190.000 <T	
1992 DEC	140.000 <T	50.000 <T	

ATRATONE (NG/L)		DET'N LIMIT = 50.0	
GUIDELINE = N/A			

22 SAMPLES	BDL	BDL	

CYANAZINE (BLADEX) (NG/L)		DET'N LIMIT = 100.0	
GUIDELINE = 10000 (A2)			

1991 FEB	BDL	BDL	
1991 APR	BDL	BDL	
1991 JUN	500.000 <T	430.000 <T	
1991 AUG	IAW	IAW	
1991 OCT	IQU	IQU	
1991 NOV	BDL	IQU	
1992 FEB	BDL	BDL	
1992 APR	BDL	BDL	
1992 JUN	110.000 <T	BDL	
1992 AUG	BDL	BDL	
1992 OCT	BDL	BDL	
1992 DEC	BDL	BDL	

DESETHYL ATRAZINE (NG/L)		DET'N LIMIT = 200.0	
GUIDELINE = 60000 (A2)			

19 SAMPLES	BDL	BDL	

GUIDELINE = N/A

GUIDELINE = 10000 (A2)

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT TREATMENT PLANT
RAW TREATED

PESTICIDES AND PCB

DESETHYL SIMAZINE (NG/L) DET'N LIMIT = 200.0 GUIDELINE = 10000 (A2)

22 SAMPLES BDL BDL

PROMETONE (NG/L) DET'N LIMIT = 50.000 GUIDELINE = 52500 (D3)

19 SAMPLES BDL BDL

PROPAGINE (NG/L) DET'N LIMIT = 50.000 GUIDELINE = 700000 (D3)

19 SAMPLES BDL BDL

PROMETRYNE (NG/L) DET'N LIMIT = 50.000 GUIDELINE = 1000 (A2)

22 SAMPLES BDL BDL

METRIBUZIN (SENCOR) (NG/L) DET'N LIMIT = 100.0 GUIDELINE = 80000 (A1)

19 SAMPLES BDL BDL

SIMAZINE (NG/L) DET'N LIMIT = 50.00 GUIDELINE = 10000 (A2)

19 SAMPLES BDL BDL

ALACHLOR (LASSO) (NG/L) DET'N LIMIT = 500.0 GUIDELINE = 5000 (A2)

19 SAMPLES BDL BDL

METOLACHLOR (NG/L) DET'N LIMIT = 500.0 GUIDELINE = 50000 (A2)

1991 FEB BDL BDL

1991 APR BDL BDL

1991 JUN BDL 750.000 <T

1991 AUG 1AW 1AW

1991 OCT BDL BDL

1991 NOV BDL BDL

1992 FEB BDL BDL

1992 APR BDL BDL

1992 JUN 820.000 <T BDL

1992 AUG BDL BDL

1992 OCT BDL BDL

1992 DEC BDL BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT TREATED
RAW

PESTICIDES AND PCB		DET'N LIMIT = 5.00	GUIDELINE = 206000 (04)
HEXACHLOROCYCLOPENTADIEN (NG/L)			
1991 FEB	BDL	BDL	
1991 APR	BDL	BDL	
1991 JUN	!QU	!QU	
1991 AUG	!AW	!AW	
1991 OCT	BDL	6.000 <T	
1991 NOV	BDL	BDL	
1992 FEB	BDL	24.000 <T	
1992 APR	!QU	!QU	
1992 JUN	!QU	!QU	
1992 AUG	!QU	!QU	
1992 OCT	!QU	!QU	
1992 DEC	!QU	!QU	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW
TREATMENT PLANT TREATED

PHENOLICS		DET'N LIMIT =	0.2	GUIDELINE =	N/A
PHENOLICS (UG/L)	PHENOLICS)				
1991 FEB	.600 <T				
1991 APR	BDL				
1991 JUN	1.600				
1991 AUG	.200 <T				
1991 OCT	.600 <T				
1991 NOV	.400 <T				
1992 FEB	BDL				
1992 APR	.800 <T				
1992 JUN	2.000				
1992 AUG	BDL				
1992 OCT	BDL				
1992 DEC	BDL				

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	POLYAROMATIC HYDROCARBONS	
PHENANTHRENE (NG/L)		DET'N LIMIT = 10.0	GUIDELINE = N/A
6 SAMPLES	BDL	BDL	
ANTHRACENE (NG/L)		DET'N LIMIT = 1.0	GUIDELINE = N/A
6 SAMPLES	BDL	BDL	
FLUORANTHENE (NG/L)		DET'N LIMIT = 20.0	GUIDELINE = 42000 (D4)
6 SAMPLES	BDL	BDL	
PYRENE (NG/L)		DET'N LIMIT = 20.0	GUIDELINE = N/A
6 SAMPLES	BDL	BDL	
BENZO(A)ANTHRACENE (NG/L)		DET'N LIMIT = 20.0	GUIDELINE = N/A
6 SAMPLES	BDL	BDL	
CHRYSENE (NG/L)		DET'N LIMIT = 50.0	GUIDELINE = N/A
6 SAMPLES	BDL	BDL	
DIMETH. BENZO(A)ANTHR (NG/L)		DET'N LIMIT = 5.0	GUIDELINE = N/A
4 SAMPLES	BDL	BDL	
BENZO(E) PYRENE (NG/L)		DET'N LIMIT = 50.0	GUIDELINE = N/A
6 SAMPLES	BDL	BDL	
BENZO(B) FLUORANTHENE (NG/L)		DET'N LIMIT = 10.0	GUIDELINE = N/A
6 SAMPLES	BDL	BDL	
PERYLENE (NG/L)		DET'N LIMIT = 10.0	GUIDELINE = N/A
6 SAMPLES	BDL	BDL	
BENZO(K) FLUORANTHENE (NG/L)		DET'N LIMIT = 1.0	GUIDELINE = N/A
6 SAMPLES	BDL	BDL	
BENZO(A) PYRENE (NG/L)		DET'N LIMIT = 5.0	GUIDELINE = 10 (A1)
6 SAMPLES	BDL	BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW TREATMENT PLANT TREATED

POLYAROMATIC HYDROCARBONS			
BENZO(G,H,I) PERYLEN (NG/L)	BDL	DET'N LIMIT = 20.0	GUIDELINE = N/A
6 SAMPLES	BDL		
DIBENZO(A,H) ANTHRAC (NG/L)	BDL	DET'N LIMIT = 10.0	GUIDELINE = N/A
6 SAMPLES	BDL		
INDENO(1,2,3-C,D) PY (NG/L)	BDL	DET'N LIMIT = 20.0	GUIDELINE = N/A
6 SAMPLES	BDL		
BENZO(B) CHRYSENE (NG/L)	BDL	DET'N LIMIT = 2.0	GUIDELINE = N/A
6 SAMPLES	BDL		
CORONENE (NG/L)	BDL	DET'N LIMIT = 10.0	GUIDELINE = N/A
6 SAMPLES	BDL		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	SPECIFIC PESTICIDES	DET'N LIMIT = 500.0	GUIDELINE = 5000 (A1)
TOXAPHENE (NG/L)				
2 SAMPLES	BDL	BDL		
2,4,5-T (NG/L)				
7 SAMPLES	BDL	BDL	DET'N LIMIT = 50.0	GUIDELINE = 280000 (A1)
2,4-D (NG/L)				
7 SAMPLES	BDL	BDL	DET'N LIMIT = 100.0	GUIDELINE = 100000 (A1)
2,4-DB (NG/L)				
7 SAMPLES	BDL	BDL	DET'N LIMIT = 200.0	GUIDELINE = N/A
2,4 D PROPIONIC ACID (NG/L)				
7 SAMPLES	BDL	BDL	DET'N LIMIT = 100.0	GUIDELINE = N/A
DICAMBA (NG/L)				
1991 JUN	1SM	380.000 <T	DET'N LIMIT = 50.0	GUIDELINE = 120000 (A1)
1991 AUG	BDL	BDL		
1991 NOV	BDL	BDL		
1992 JUN	180.000 <T	130.000 <T		
2,4,5-TP- (SILVEX) (NG/L)				
7 SAMPLES	BDL	BDL	DET'N LIMIT = 20.00	GUIDELINE = 10000 (A1)
DIAZINON (NG/L)				
4 SAMPLES	BDL	BDL	DET'N LIMIT = 20.0	GUIDELINE = 20000 (A1)
DICHLOROVOS (NG/L)				
4 SAMPLES	BDL	BDL	DET'N LIMIT = 20.0	GUIDELINE = N/A
CHLORPYRIFOS (NG/L)				
4 SAMPLES	BDL	BDL	DET'N LIMIT = 20.0	GUIDELINE = N/A
ETHION (NG/L)				
4 SAMPLES	BDL	BDL	DET'N LIMIT = 20.0	GUIDELINE = 35000 (G)

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	SPECIFIC PESTICIDES	DET'N LIMIT = 20.0	GUIDELINE = 190000 (A1)
MALATHION (NG/L)				
4 SAMPLES	BDL	BDL		
MEVINPHOS (NG/L)			DET'N LIMIT = 20.0	GUIDELINE = N/A
4 SAMPLES	BDL	BDL		
METHYL PARATHION (NG/L)			DET'N LIMIT = 50.0	GUIDELINE = 9000 (D3)
4 SAMPLES	BDL	BDL		
METHYLTRITHION (NG/L)			DET'N LIMIT = 20.0	GUIDELINE = N/A
4 SAMPLES	BDL	BDL		
PARATHION (NG/L)			DET'N LIMIT = 20.0	GUIDELINE = 50000 (A1)
4 SAMPLES	BDL	BDL		
PHORATE (NG/L)			DET'N LIMIT = 20.0	GUIDELINE = 2000 (A2)
4 SAMPLES	BDL	BDL		
RELDAN (NG/L)			DET'N LIMIT = 20.0	GUIDELINE = N/A
4 SAMPLES	BDL	BDL		
RONNEL (NG/L)			DET'N LIMIT = 20.0	GUIDELINE = N/A
4 SAMPLES	BDL	BDL		
CARBOFURAN (NG/L)			DET'N LIMIT = 2000.0	GUIDELINE = 90000 (A1)
6 SAMPLES	BDL	BDL		
CHLORPROPHAM (CIPC) (NG/L)			DET'N LIMIT = 2000.0	GUIDELINE = 350000 (G)
6 SAMPLES	BDL	BDL		
DIALATE (NG/L)			DET'N LIMIT = 2000.0	GUIDELINE = N/A
6 SAMPLES	BDL	BDL		
EPTAM (NG/L)			DET'N LIMIT = 2000.0	GUIDELINE = N/A
6 SAMPLES	BDL	BDL		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	SPECIFIC PESTICIDES	
IPC (NG/L)		DET'N LIMIT = 2000.0	GUIDELINE = N/A
6 SAMPLES	BOL		
PROPOXUR (NG/L)		DET'N LIMIT = 2000.0	GUIDELINE = 140000 (D3)
6 SAMPLES	BOL		
CARBARYL (NG/L)		DET'N LIMIT = 200.0	GUIDELINE = 90000 (A1)
6 SAMPLES	BOL		
BUTYLATE (NG/L)		DET'N LIMIT = 2000.0	GUIDELINE = 245000 (D3)
6 SAMPLES	BOL		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	
VOLATILES			
BENZENE (UG/L)		DET'N LIMIT = 0.05	
		GUIDELINE = 5 (A1)	
1991 FEB	BDL	.050 <T	
1991 APR	BDL	BDL	
1991 JUN	BDL	.050 <T	
1991 AUG	BDL	.150 <T	
1991 OCT	BDL	BDL	
1991 NOV	BDL	BDL	
1992 FEB	BDL	BDL	
1992 APR	BDL	BDL	
1992 JUN	BDL	BDL	
1992 AUG	BDL	BDL	
1992 OCT	BDL	BDL	
1992 DEC	BDL	BDL	
TOLUENE (UG/L)		DET'N LIMIT = 0.05	
		GUIDELINE = 24 (A3)	
1991 FEB	.050 <T	.200 <T	
1991 APR	BDL	BDL	
1991 JUN	BDL	.250 <T	
1991 AUG	BDL	.550	
1991 OCT	BDL	.050 <T	
1991 NOV	BDL	.050 <T	
1992 FEB	BDL	BDL	
1992 APR	BDL	BDL	
1992 JUN	BDL	.050 <T	
1992 AUG	BDL	.050 <T	
1992 OCT	BDL	.050 <T	
1992 DEC	BDL	.100 <T	
ETHYLBENZENE (UG/L)		DET'N LIMIT = 0.05	
		GUIDELINE = 2.4 (A3)	
1991 FEB	.050 <T	.200 <T	
1991 APR	BDL	.100 <T	
1991 JUN	BDL	.100 <T	
1991 AUG	BDL	.200 <T	
1991 OCT	BDL	BDL	
1991 NOV	BDL	.100 <T	
1992 FEB	BDL	.050 <T	
1992 APR	BDL	.100 <T	
1992 JUN	BDL	.100 <T	
1992 AUG	BDL	.050 <T	
1992 OCT	BDL	.050 <T	
1992 DEC	BDL	.050 <T	
P-XYLENE (UG/L)		DET'N LIMIT = 0.10	
		GUIDELINE = 300 (A3*)	
24 SAMPLES	BDL	BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW		TREATMENT PLANT TREATED	
VOLATILES		DET'N LIMIT = 0.10	
M-XYLENE (UG/L)		GUIDELINE = 300 (A3*)	
1991 FEB	BOL	.500 <T	
1991 APR	BOL	.100 <T	
1991 JUN	BOL	BOL	
1991 AUG	BOL	.200 <T	
1991 OCT	BOL	BOL	
1991 NOV	BOL	BOL	
1991 DEC	BOL	BOL	
1992 FEB	BOL	BOL	
1992 APR	BOL	BOL	
1992 JUN	BOL	BOL	
1992 AUG	BOL	BOL	
1992 OCT	BOL	BOL	
1992 DEC	BOL	BOL	
O-XYLENE (UG/L)		DET'N LIMIT = 0.05	
		GUIDELINE = 300 (A3*)	
1991 FEB	BOL	.350 <T	
1991 APR	BOL	.100 <T	
1991 JUN	BOL	BOL	
1991 AUG	BOL	.100 <T	
1991 OCT	BOL	BOL	
1991 NOV	BOL	BOL	
1992 FEB	BOL	BOL	
1992 APR	BOL	BOL	
1992 JUN	BOL	BOL	
1992 AUG	BOL	BOL	
1992 OCT	BOL	BOL	
1992 DEC	BOL	BOL	
STYRENE (UG/L)		DET'N LIMIT = 0.05	
		GUIDELINE = 100 (D1)	
1991 FEB	.100 <T	BOL	
1991 APR	BOL	BOL	
1991 JUN	BOL	BOL	
1991 AUG	BOL	BOL	
1991 OCT	BOL	BOL	
1991 NOV	BOL	BOL	
1992 FEB	.050 <T	BOL	
1992 APR	BOL	BOL	
1992 JUN	BOL	BOL	
1992 AUG	BOL	BOL	
1992 OCT	BOL	BOL	
1992 DEC	BOL	BOL	
1,1-DICHLOROETHYLENE (UG/L)		DET'N LIMIT = 0.100	
		GUIDELINE = 7 (D1)	
24 SAMPLES	BOL	BOL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED	VOLATILES	
METHYLENE CHLORIDE (UG/L)		DET'N LIMIT = 0.50	GUIDELINE = 50 (A1)
24 SAMPLES	BDL	BDL	
1,1,2-DICHLOROETHYLENE (UG/L)		DET'N LIMIT = 0.10	GUIDELINE = 70 (D1)
24 SAMPLES	BDL	BDL	
1,1-DICHLOROETHANE (UG/L)		DET'N LIMIT = 0.100	GUIDELINE = N/A
24 SAMPLES	BDL	BDL	
CHLOROFORM (UG/L)		DET'N LIMIT = 0.10	GUIDELINE = 350 (A1+)
1991 FEB	BDL	21.100	
1991 APR	BDL	31.500	
1991 JUN	BDL	15.700	
1991 AUG	BDL	19.100	
1991 OCT	BDL	11.900	
1991 NOV	BDL	11.300	
1992 FEB	BDL	8.500	
1992 APR	BDL	14.400	
1992 JUN	BDL	15.000	
1992 AUG	BDL	25.200	
1992 OCT	BDL	48.600	
1992 DEC	BDL	22.500	
1,1,1-TRICHLOROETHANE (UG/L)		DET'N LIMIT = 0.02	GUIDELINE = 200 (D1)
1991 FEB	.060 <T	.060 <T	
1991 APR	BDL	.060 <T	
1991 JUN	.280	.080 <T	
1991 AUG	.060 <T	.080 <T	
1991 OCT	.040 <T	BDL	
1991 NOV	BDL	BDL	
1992 FEB	BDL	BDL	
1992 APR	BDL	BDL	
1992 JUN	BDL	BDL	
1992 AUG	BDL	BDL	
1992 OCT	BDL	BDL	
1992 DEC	BDL	BDL	
1,2 DICHLOROETHANE (UG/L)		DET'N LIMIT = 0.05	GUIDELINE = 5 (A1)
24 SAMPLES	BDL	BDL	

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED		
VOLATILES			
CARBON TETRACHLORIDE (UG/L)		DET'N LIMIT = 0.20	GUIDELINE = 5 (A1)
24 SAMPLES	BDL		
1,2-DICHLOROPROPANE (UG/L)		DET'N LIMIT = 0.05	GUIDELINE = 5 (D1)
24 SAMPLES	BDL		
TRICHLOROETHYLENE (UG/L)		DET'N LIMIT = 0.10	GUIDELINE = 50 (A1)
24 SAMPLES	BDL		
DICHLOROBROMOMETHANE (UG/L)		DET'N LIMIT = 0.05	GUIDELINE = 350 (A1+)
1991 FEB	BDL		
1991 APR	BDL		
1991 JUN	BDL		
1991 AUG	BDL		
1991 OCT	BDL		
1991 NOV	BDL		
1992 FEB	BDL		
1992 APR	BDL		
1992 JUN	BDL		
1992 AUG	BDL		
1992 OCT	BDL		
1992 DEC	BDL		
112-TRICHLOROETHANE (UG/L)		DET'N LIMIT = 0.05	GUIDELINE = 0.6 (D4)
24 SAMPLES	BDL		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT
RAW

TREATMENT PLANT
TREATED

VOIATILES

CHLOROORBROMOMETHANE (UG/L) DET'N LIMIT = 0.10

GUIDELINE = 350 (A1+)

1991 FEB BDL 5.700
1991 APR BDL 5.700
1991 JUN BDL
1991 AUG BDL 5.200
1991 OCT BDL 1.900
1991 NOV BDL 5.700
1992 FEB BDL 4.000
1992 APR BDL 5.600
1992 JUN BDL 6.000
1992 AUG BDL 4.000
1992 OCT BDL 2.200
1992 DEC BDL 5.300

TETRACHLOROETHYLENE (UG/L) DET'N LIMIT = 0.05

GUIDELINE = 65 (A5)

24 SAMPLES BDL

BROMOFORM (UG/L) DET'N LIMIT = 0.20

GUIDELINE = 350 (A1+)

1991 FEB BDL .400 <T
1991 APR BDL .400 <T
1991 JUN BDL
1991 AUG BDL .400 <T
1991 OCT BDL
1991 NOV BDL .600 <T
1992 FEB BDL
1992 APR BDL
1992 JUN BDL
1992 AUG BDL
1992 OCT BDL
1992 DEC BDL

1122-TETRACHLOROETHANE (UG/L) DET'N LIMIT = 0.05

GUIDELINE = 0.17 (D4)

24 SAMPLES BDL

VINYL CHLORIDE (UG/L) DET'N LIMIT = 0.100

GUIDELINE = 2 (D1)

12 SAMPLES BDL

C12-DICHLOROETHYLENE (UG/L) DET'N LIMIT = 0.100

GUIDELINE = 70 (D1)

12 SAMPLES BDL

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW	TREATMENT PLANT TREATED		
VOLATILES			
CHLOROBENZENE (UG/L)		DET'N LIMIT = 0.10	GUIDELINE = 1510 (D3)
24 SAMPLES	BDL		
1,4-DICHLOROBENZENE (UG/L)		DET'N LIMIT = 0.10	GUIDELINE = 5 (A1)
24 SAMPLES	BDL		
1,3-DICHLOROBENZENE (UG/L)		DET'N LIMIT = 0.10	GUIDELINE = 3750 (D3)
24 SAMPLES	BDL		
1,2-DICHLOROBENZENE (UG/L)		DET'N LIMIT = 0.05	GUIDELINE = 200 (A1)
24 SAMPLES	BDL		
ETHYLENE DIBROMIDE (UG/L)		DET'N LIMIT = 0.05	GUIDELINE = 50 (D1)
24 SAMPLES	BDL		
TOL TRIHALOMETHANES (UG/L)		DET'N LIMIT = 0.50	GUIDELINE = 350 (A1)
1991 FEB	BDL		
1991 APR	52.650		
1991 JUN	28.000		
1991 AUG	36.600		
1991 OCT	19.900		
1991 NOV	27.300		
1992 FEB	20.600		
1992 APR	30.500		
1992 JUN	33.350		
1992 AUG	41.700		
1992 OCT	65.150		
1992 DEC	43.100		

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992 MITCHELL'S BAY WTP

TREATMENT PLANT RAW
TREATMENT PLANT TREATED

RADIONUCLIDES		DET'N LIMIT = 0.70	GUIDELINE = N/A
COBALT 60 (BQ/L)	BDL		
6 SAMPLES	BDL		
CESIUM 134 (BQ/L)	BDL	DET'N LIMIT = 0.70	GUIDELINE = N/A
6 SAMPLES	BDL		
CESIUM 137 (BQ/L)	BDL	DET'N LIMIT = 0.70	GUIDELINE = 50 (A1)
6 SAMPLES	BDL		
GROSS ALPHA COUNT (BQ/L)		DET'N LIMIT = 0.04	GUIDELINE = 0.55 (D1)
1991 AUG	.040		
1992 FEB	BDL		
1992 AUG	BDL		
GROSS BETA COUNT (BQ/L)		DET'N LIMIT = 0.04	GUIDELINE = N/A
1991 AUG	.040		
1992 FEB	.070		
1992 AUG	.070		
TRITIUM (BQ/L)		DET'N LIMIT = 7.00	GUIDELINE = 40000 (A1)
1991 AUG	BDL		
1992 FEB	BDL		
1992 AUG	11,000		
IODINE 131 (BQ/L)		DET'N LIMIT = 0.70	GUIDELINE = 10 (A1)
6 SAMPLES	BDL		

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BACTERIOLOGICAL			
FECAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	0 (A1)
STANDARD PLATE COUNT MEMBRANE FILT.	CT/ML	0	500/ML (A3)
TOTAL COLIFORM BACKGROUND MF	CT/100ML	0	N/A
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100ML (A1)
CHEMISTRY (FLD)			
FIELD COMBINED CHLORINE RESIDUAL	MG/L	0	N/A
FIELD TOTAL CHLORINE RESIDUAL	MG/L	0	N/A
FIELD FREE CHLORINE RESIDUAL	MG/L	0	N/A
FIELD PH	DMNSLESS	N/A	6.5-8.5 (A4)
FIELD TEMPERATURE	DEG.C	N/A	15.0 (A3)
FIELD TURBIDITY	FTU	N/A	1.0 (A1)
CHEMISTRY (LAB)			
ALKALINITY	MG/L	0.20	30-500 (A4)
AMMONIUM TOTAL	MG/L	0.002	0.05 (F2)
CALCIUM	MG/L	0.20	100.0 (F2)
CHLORIDE	MG/L	0.20	250.0 (A3)
COLOUR	TCU	0.50	5.0 (A3)
CONDUCTIVITY	UMHO/CM	1.00	400.0 (F2)
CYANIDE	MG/L	0.001	0.2 (A1)
DISSOLVED ORGANIC CARBON	MG/L	0.10	5.0 (A3)
FLUORIDE	MG/L	0.01	1.5* (A1)
HARDNESS	MG/L	0.50	80-100 (A4)
IONCAL	DMNSLESS	N/A	N/A
LANGELIERS INDEX	DMNSLESS	N/A	N/A
MAGNESIUM	MG/L	0.10	30.0 (F2)
NITRATES (TOTAL)	MG/L	0.005	10.0 (A1)
NITRITE	MG/L	0.001	1.0 (A1)
NITROGEN TOTAL KJELDAHL	MG/L	0.02	N/A
PH	DMNSLESS	N/A	6.5-8.5 (A4)
PHOSPHORUS FIL REACT	MG/L	0.0005	N/A
PHOSPHORUS TOTAL	MG/L	0.002	0.4 (F2)
POTASSIUM	MG/L	0.010	10.0 (F2)
RESIDUE FILTRATE (CALCULATED TDS)	MG/L	N/A	500.0 (A3)
SODIUM	MG/L	0.20	200.0 (A4)
SULPHATE	MG/L	0.20	500.0 (A4)
TURBIDITY	FTU	0.05	1.0 (A1)
* The Maximum Acceptable Concentration (MAC) for <u>naturally occurring fluoride</u> in drinking water is 2.4 mg/L.			
CHLOROAROMATICS			
1,2,3-TRICHLOROBENZENE	NG/L	5.0	N/A
1,2,3,4-TETRACHLOROBENZENE	NG/L	1.0	N/A
1,2,3,5-TETRACHLOROBENZENE	NG/L	1.0	N/A
1,2,4-TRICHLOROBENZENE	NG/L	5.0	10000 (I)
1,2,4,5-TETRACHLOROBENZENE	NG/L	1.0	38000. (D4)
1,3,5-TRICHLOROBENZENE	NG/L	5.0	N/A
2,3,6-TRICHLOROTOLUENE	NG/L	5.0	N/A
2,4,5-TRICHLOROTOLUENE	NG/L	5.0	N/A
2,6A-TRICHLOROTOLUENE	NG/L	5.0	N/A
HEXACHLOROBENZENE (HCB)	NG/L	1.0	10 (C1)
HEXACHLOROBUTADIENE	NG/L	1.0	450 (D4)
HEXACHLOROETHANE	NG/L	1.0	1900 (D4)
OCTACHLOROSTYRENE	NG/L	1.0	N/A
PENTACHLOROBENZENE	NG/L	1.0	74000 (D4)
CHLOROPHENOLS			
2,3,4-TRICHLOROPHENOL	NG/L	100.0	N/A
2,3,4,5-TETRACHLOROPHENOL	NG/L	20.0	N/A
2,3,5,6-TETRACHLOROPHENOL	NG/L	10.0	N/A

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
2,4,5-TRICHLOROPHENOL	NG/L	100.0	2600000 (D4)
2,4,6-TRICHLOROPHENOL	NG/L	20.0	5000 (A1)
PENTACHLOROPHENOL	NG/L	10.0	60000 (A1)
METALS			
ALUMINUM	UG/L	0.10	100 (A4)
ANTIMONY	UG/L	0.05	146 (D4)
ARSENIC	UG/L	0.10	25 (A1)
BARIUM	UG/L	0.05	1000 (A2)
BERYLLIUM	UG/L	0.05	6800 (D4)
BORON	UG/L	2.00	5000 (A1)
CADMIUM	UG/L	0.05	5 (A1)
CHROMIUM	UG/L	0.50	50 (A1)
COBALT	UG/L	0.02	N/A
COPPER	UG/L	0.50	1000 (A3)
IRON	UG/L	6.00	300 (A3)
LEAD	UG/L	0.05	10 (A1)
MANGANESE	UG/L	0.05	50 (A3)
MERCURY	UG/L	0.02	1 (A1)
MOLYBDENUM	UG/L	0.05	N/A
NICKEL	UG/L	0.20	350 (D3)
SELENIUM	UG/L	1.00	10 (A1)
SILVER	UG/L	0.05	N/A
STRONTIUM	UG/L	0.10	N/A
THALLIUM	UG/L	0.05	13 (D4)
TITANIUM	UG/L	0.50	N/A
URANIUM	UG/L	0.05	100 (A1)
VANADIUM	UG/L	0.05	N/A
ZINC	UG/L	0.20	5000 (A3)
POLYNUCLEAR AROMATIC HYDROCARBONS			
ANTHRACENE	NG/L	1.0	N/A
BENZO(A) ANTHRACENE	NG/L	20.0	N/A
BENZO(A) PYRENE	NG/L	5.0	10 (A1)
BENZO(B) CHRYSENE	NG/L	2.0	N/A
BENZO(B) FLUORANTHENE	NG/L	10.0	N/A
BENZO(E) PYRENE	NG/L	50.0	N/A
BENZO(G,H,I) PERYLENE	NG/L	20.0	N/A
BENZO(K) FLUORANTHENE	NG/L	1.0	N/A
CHRYSENE	NG/L	50.0	N/A
CORONENE	NG/L	10.0	N/A
DIBENZO(A,H) ANTHRACENE	NG/L	10.0	N/A
DIMETHYL BENZO(A) ANTHRACENE	NG/L	5.0	N/A
FLUORANTHENE	NG/L	20.0	42000 (D4)
INDENO(1,2,3-C,D) PYRENE	NG/L	20.0	N/A
PERYLENE	NG/L	10.0	N/A
PHENANTHRENE	NG/L	10.0	N/A
PYRENE	NG/L	20.0	N/A
PESTICIDES & PCB			
ALACHLOR (LASSO)	NG/L	500.0	5000 (A2)
ALDRIN	NG/L	1.0	700 (A1)
ALPHA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	700 (G)
ALPHA CHLORDANE	NG/L	2.0	7000 (A1)
AMETRINE	NG/L	50.0	300000 (D3)
ATRAZONE	NG/L	50.0	N/A
ATRAZINE	NG/L	50.0	60000 (A2)
DESETHYL ATRAZINE	NG/L	200.0	60000 (A2)
BETA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	300 (G)
CYANAZINE (BLADEX)	NG/L	100.0	10000 (A2)
DIELDRIN	NG/L	2.0	700 (A1)
ENDOSULFAN 1 (THIODAN I)	NG/L	2.0	74000 (D4)
ENDOSULFAN 2 (THIODAN II)	NG/L	5.0	74000 (D4)
ENDOSULFAN SULPHATE (THIODAN SULPHATE)	NG/L	5.0	N/A

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
ENDRIN	NG/L	5.0	1600 (D3)
GAMMA CHLORDANE	NG/L	2.0	7000 (A1)
HEPTACHLOR	NG/L	1.0	3000 (A1)
HEPTACHLOR EPOXIDE	NG/L	1.0	3000 (A1)
HEXACHLOROCYCLOPENTADIENE	NG/L	5.0	206000 (D4)
LINDANE (GAMMA BHC)	NG/L	1.0	4000 (A1)
METHOXYCHLOR	NG/L	5.0	900000 (A1)
METOLACHLOR	NG/L	500.0	50000 (A2)
METRIBUZIN (SENCOR)	NG/L	100.0	80000 (A1)
MIREX	NG/L	5.0	N/A
P,P-DDD	NG/L	5.0	30000 (A1)
O,P-DDT	NG/L	5.0	30000 (A1)
P,P-DDT	NG/L	5.0	30000 (A1)
P,P-DDE	NG/L	1.0	30000 (A1)
OXYCHLORDANE	NG/L	2.0	N/A
PCB	NG/L	20.0	3000 (A2)
PROMETONE	NG/L	50.0	52500 (D3)
PROMETRYNE	NG/L	50.0	1000 (A2)
PROPAGINE	NG/L	50.0	700000 (D3)
SIMAZINE	NG/L	50.0	10000 (A2)
DESETHYL SIMAZINE	NG/L	200.0	10000 (A2)
TOXAPHENE	NG/L	500.0	5000 (A1)
PHENOLICS			
PHENOLICS (UNFILTERED REACTIVE)	UG/L	0.2	N/A
SPECIFIC PESTICIDES			
2,4 D PROPIONIC ACID	NG/L	100.0	N/A
2,4,5-TRICHLOROPHENOXY ACETIC ACID	NG/L	50.0	280000 (A1)
2,4-DICHLOROBUTYRIC ACID (2,4-D)	NG/L	100.0	100000 (A1)
2,4-DICHLOROPHENOXYBUTYRIC ACID (2,4-DB)	NG/L	200.0	N/A
2,4,5-TP (SILVEX)	NG/L	20.0	10000 (A1)
BUTYLATE (SUTAN)	NG/L	2000.0	245000 (D3)
CARBARYL (SEVIN)	NG/L	200.0	90000 (A1)
CARBOFURAN	NG/L	2000.0	90000 (A1)
CHLORPROPHAM (CIPC)	NG/L	2000.0	350000 (G)
CHLORPYRIFOS (DURSBAN)	NG/L	20.0	N/A
DIALATE	NG/L	2000.0	N/A
DIAZINON	NG/L	20.0	20000 (A1)
DICAMBA	NG/L	50.0	120000 (A1)
DICHLOROVOS	NG/L	20.0	N/A
EPTAM	NG/L	2000.0	N/A
ETHION	NG/L	20.0	35000 (G)
IPC	NG/L	2000.0	N/A
MALATHION	NG/L	20.0	190000 (A1)
METHYL PARATHION	NG/L	50.0	9000 (D3)
METHYLTRITHION	NG/L	20.0	N/A
MEVINPHOS	NG/L	20.0	N/A
PARATHION	NG/L	20.0	50000 (A1)
PHORATE (THIMET)	NG/L	20.0	2000 (A2)
PICHLORAM	NG/L	100.0	190000 (A2)
PROPOXUR (BAYGON)	NG/L	2000.0	140000 (D3)
RELDAN	NG/L	20.0	N/A
RONNEL	NG/L	20.0	N/A
VOLATILES			
1,1-DICHLOROETHANE	UG/L	0.10	N/A
1,1-DICHLOROETHYLENE	UG/L	0.10	7 (D1)
1,2-DICHLOROBENZENE	UG/L	0.05	200 (A1)
1,2-DICHLOROETHANE	UG/L	0.05	5 (A1)
1,2-DICHLOROPROPANE	UG/L	0.05	5 (D1)
1,3-DICHLOROBENZENE	UG/L	0.10	3750 (D3)
1,4-DICHLOROBENZENE	UG/L	0.10	5 (A1)
1,1,1-TRICHLOROETHANE	UG/L	0.02	200 (D1)
1,1,2-TRICHLOROETHANE	UG/L	0.05	0.6 (D4)
1,1,2,2-TETRACHLOROETHANE	UG/L	0.05	0.17 (D4)

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM 1991 AND 1992

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BENZENE	UG/L	0.05	5 (A1)
BROMOFORM	UG/L	0.20	350 (A1+)
CARBON TETRACHLORIDE	UG/L	0.20	5 (A1)
CHLOROBENZENE	UG/L	0.10	1510 (D3)
CHLORODIBROMOMETHANE	UG/L	0.10	350 (A1+)
CHLOROFORM	UG/L	0.10	350 (A1+)
CIS 1,2-DICHLOROETHYLENE	UG/L	0.10	70 (D1)
DICHLOROBROMOMETHANE	UG/L	0.05	350 (A1+)
ETHYLENE DIBROMIDE	UG/L	0.05	50 (D1)
ETHYLBENZENE	UG/L	0.05	2.4 (A3)
M-XYLENE	UG/L	0.10	300 (A3*)
METHYLENE CHLORIDE	UG/L	0.50	50 (A1)
O-XYLENE	UG/L	0.05	300 (A3*)
P-XYLENE	UG/L	0.10	300 (A3*)
STYRENE	UG/L	0.05	100 (D1)
TETRACHLOROETHYLENE	UG/L	0.05	65 (A5)
TRANS 1,2-DICHLOROETHYLENE	UG/L	0.10	70 (D1)
TOLUENE	UG/L	0.05	24 (A3)
TOTAL TRIHALOMETHANES	UG/L	0.50	350 (A1)
TRICHLOROETHYLENE	UG/L	0.10	50 (A1)
VINYL CHLORIDE	UG/L	0.10	2 (D1)
RADIONUCLIDES			
TRITIUM	BQ/L	7.0	40000 (A1)
GROSS ALPHA COUNT	BQ/L	0.04	0.55# (D1)
GROSS BETA COUNT	BQ/L	0.04	N/A
COBALT 60	BQ/L	0.70	N/A
CESIUM 134	BQ/L	0.70	N/A
CESIUM 137	BQ/L	0.70	50 (A1)
IODINE 131	BQ/L	0.70	10 (A1)

Equal to 15.0 Picocuries/litre

DRINKING WATER SURVEILLANCE PROGRAM
PROGRAM DESCRIPTION

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality;
- a flagging mechanism for guideline exceedance;
- a definition of contaminant levels and trends;
- a comprehensive background for remedial action;
- a framework for assessment of new contaminants; and
- an indication of treatment efficiency of plant processes.

PROGRAM

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario. In 1992, 109 systems were being monitored. Water supply locations have been prioritized for surveillance based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit.

A major goal of the program is to collect valid water quality data in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analyzed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling, in order to acquire complete plant process and distribution system details and to designate (and retrofit if necessary) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of raw (ambient water) and treated water at the treatment plant and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled. Sampling is carried out by operational personnel who have been trained in applicable procedures.

Comprehensive standardized procedures and field test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". Most laboratory analyses are carried out by the Ministry of Environment and Energy (MOEE), Laboratory Services Branch. Radionuclides are analyzed by the Ministry of Labour.

DATA REPORTING MECHANISM

When the analytical results are transferred from the MOEE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOEE District Officer, the appropriate operational staff and are also retained by the DWSP unit.

PROGRAM INPUTS AND OUTPUTS

There are four major inputs and four major outputs in the program.

Program Input - Plant and Distribution System Description

The system description includes plant specific non-analytical information acquired through a questionnaire and an initial plant visit. During the initial assessment of the plant and distribution system, questionnaire content is verified and missing information added. It is intended that all data be kept current with scheduled annual updates.

The Plant and Distribution System Description consists of the following seven components:

1. PROCESS COMPONENT INVENTORY

All physical and chemical processes to which the water is subjected, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. TREATMENT CHEMICALS

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. Chemical dosages applied on the day of sampling are recorded in DWSP.

3. PROCESS CONTROL MEASUREMENTS

Documentation of in-plant monitoring of process parameters (eg. turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in this section. Except for the recorded Field Data, in-plant monitoring results are not retained in DWSP but are retained by the water treatment plant personnel.

4. DESIGN FLOW AND RETENTION TIME

Hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. Maximum, minimum and average flow, as well as a record of the flow rate on the day of sampling, are recorded in DWSP.

5. DISTRIBUTION SYSTEM DESCRIPTION

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. SAMPLING SYSTEM

Each plant is assessed for its adequacy in terms of the sampling of bacteriological, organic and inorganic parameters. Prime considerations in the assessment and design of the sampling system are:

- i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;
- ii/ the water being sampled is not being modified by the sampling system;
- iii/ the sample tap must be in a clean area of the plant, preferably a lab area; and
- iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap); pump characteristics (model, type, capacity); and flow rate.

7. PERSONNEL

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate MOEE personnel associated with the plant.

Program Input - Field Data

The second major input to DWSP is field data. Field data is collected at the plant and from the distribution system sites on the day of sampling. Field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used, dosages, flow and retention time on the day of sampling, as well as, monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free, combined and total), temperature and pH. These parameters are analyzed according to standardized DWSP protocols to allow for interplant comparison.

Program Input - Laboratory Analytical Data

The third major input to DWSP is Laboratory Analytical Data. Samples gathered from the raw, treated and distribution sampling sites are analyzed for the presence of approximately 180 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. Parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments, parameters may be measured in a "scan" producing some results for parameters that are not on the DWSP priority list, but which may be of interest. The majority of parameters are measured on a routine basis. Those that are technically more difficult and/or costly to analyze, however, are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change, notation will be made and comparison data documented.

Program Input - Parameter Reference Information

The fourth major input to DWSP is Parameter Reference Information. This is a catalogue of information for each substance analyzed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database. An example is shown in figure 1.

Program output - Query

All DWSP information is easily accessed through the Query function, therefore, anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOEE offices is being developed by the DWSP group.

Program Output - Action Alerts

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the Ontario Drinking Water Objectives publication. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective, an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of the confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedances at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, guidelines/limits from other agencies are used. The Parameter Listing System, published by MOEE (ISBN 0-7729-4461-X), catalogues and keeps current guidelines for 650 parameters from agencies throughout the world. If these guidelines are exceeded, the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

Program Output - Report Generation

Custom reports can be generated from DWSP to meet MOEE Regional needs and to respond to public requests.

Program Output - Annual Reports

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG.1

PARAMETER REFERENCE INFORMATION

NAME: BENZENE

CAS#: 71-43-2

MOLECULAR FORMULAE: C_6H_6

DETECTION LIMIT: (FOR METHOD POCODO) 0.05 $\mu\text{g/L}$

SYNONYMS: BENZOL; BENZOLE; COAL NAPHTHA; CARBON OIL (27)
CYCLOHEXATRIENE (41)

CHARACTERISTICS: COLOURLESS TO LIGHT-YELLOW, MOBILE, NONPOLAR LIQUID, OF
HIGHLY REFRACTIVE NATURE, AROMATIC ODOUR; VAPOURS BURN
WITH SMOKING FLAME (30)

PROPERTIES: SOLUBILITY IN WATER: 1780-1800 mg/L AT 25C (41)
THRESHOLD ODOUR: 0.5 - 10 PPM IN WATER
THRESHOLD TASTE: 0.5 mg/L IN WATER (39)
ENVIRONMENTAL FATE: MAY BIOACCUMULATE IN LIVING ORGANISMS
AND APPEARS TO ACCUMULATE IN ANIMAL TISSUES THAT EXHIBIT
A HIGH LIPID CONTENT OR REPRESENT MAJOR METABOLIC SITES,
SUCH AS LIVER OR BRAIN; SMALL QUANTITIES EVAPORATE FROM
SOILS OR ARE DEGRADED RATHER QUICKLY (80)

SOURCES: COMMERCIAL: PETROLEUM REFINING; SOLVENT RECOVERY; COAL TAR
DISTILLATION (39); FOOD PROCESSING AND TANNING INDUSTRIES;
COMBUSTION OF CAR EXHAUST.
ENVIRONMENTAL: POSSIBLE SOURCE IS RUNOFF.

USES: DETERGENTS; NYLON; INTERMEDIATE IN PRODUCTION OF OTHER
COMPOUNDS, SUCH AS PESTICIDES; SOLVENT FOR EXTRACTION AND
RECTIFICATION IN RUBBER INDUSTRY; DEGREASING AND CLEANSING
AGENT; GASOLINE.

REMOVAL: THE FOLLOWING PROCESSES HAVE BEEN SUCCESSFUL IN REMOVING
BENZENE FROM WASTEWATER: GAC ADSORPTION, PRECIPITATION
WITH ALUM AND SUBSEQUENT REMOVAL VIA SEDIMENTATION,
COAGULATION AND FLOCCULATION, SOLVENT EXTRACTION,
OXIDATION

ADDITIONAL PROPERTIES: MOLECULAR WEIGHT: 78.12
MELTING POINT: 5.5°C (27)
BOILING POINT: 80.1°C (27)
SPECIFIC GRAVITY: 0.8790 AT 20°C (27)
VAPOUR PRESSURE: 100 MM AT 26.1°C (27)
HENRY'S LAW CONSTANT: 0.00555 ATM-M3/MOLE (41)
LOG OCT./WATER PARTITION COEFFICIENT: 1.95 TO 2.13 (39)
CARBON ADSORPTION: $K=1.0$; $1/N=1.6$; $R=0.97$; $PH=5.3$ (41)
SEDIMENT/WATER PARTITION COEFFICIENT: NO DATA

Appendix B

DWSP SAMPLING GUIDELINE

i) Raw and Treated at Plant

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-220 mL plastic bottle with white seal on cap -do <u>not</u> rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (Caution: HNO_3 is corrosive)
Volatiles (duplicates) (OPOPOP)	-45 mL glass vial with septum (teflon side must be in contact with sample) -do <u>not</u> rinse bottle -fill bottle completely without bubbles
Organics (OWOC), (OWTRI)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top
Specific Pesticides (OWCP), (PEOP), (PECAR)	-as per Organics -three extra bottles must be filled
Polyaromatic hydrocarbons (OAPAHX)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top -add 25 drops of sodium thiosulphate
Cyanide (Treated only)	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops sodium hydroxide (NaOH) (Caution: NaOH is corrosive)
Mercury	-250 mL glass bottle -rinse bottle and cap three times -fill to top of label -add 20 drops each nitric acid (HNO_3) and potassium dichromate ($\text{K}_2\text{Cr}_2\text{O}_7$) (Caution: HNO_3 & $\text{K}_2\text{Cr}_2\text{O}_7$ are corrosive)

Phenols	-250 mL glass bottle -do <u>not</u> rinse bottle, preservative has been added -fill to top of label
Radionuclides (as scheduled)	-4 L plastic jug -do <u>not</u> rinse, carrier added -fill to 5 cm from top
Organic Characterization (GC/MS - once per year) (PBVOL), (PBEXT)	-1 L amber glass bottle; instructions as per organic -250 mL glass bottle -do <u>not</u> rinse bottle -fill completely without bubbles

Steps:

1. Let sampling water tap run for an adequate time to clear the sample line.
2. Record time of day on submission sheet.
3. Record temperature on submission sheet.
4. Fill up all bottles as per instructions.
5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.
6. No smoking in area of sample location.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (Caution: HNO_3 is corrosive)

Steps:

1. Record time of day on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.

5. Fill general chemistry and metals bottles.

6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-250 mL plastic bottle with white seal on cap -do <u>not</u> rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid HNO_3 (Caution: HNO_3 is corrosive)
Volatiles (duplicate) (OPOPUP)	-45 mL glass vial with septum (teflon side must be in contact with sample) -do <u>not</u> rinse bottle, preservative has been added -fill bottle completely without bubbles
Organics (OWOC)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top
Polyaromatic Hydrocarbons (OAPAHX)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top -add 25 drops of sodium thiosulphate

Steps:

1. Record time of day on submission sheet.

2. Let cold water flow for five minutes.

3. Record temperature on submission sheet.

4. Fill all bottles as per instructions.

5. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

